

PAINT and VARNISH *Production.*

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

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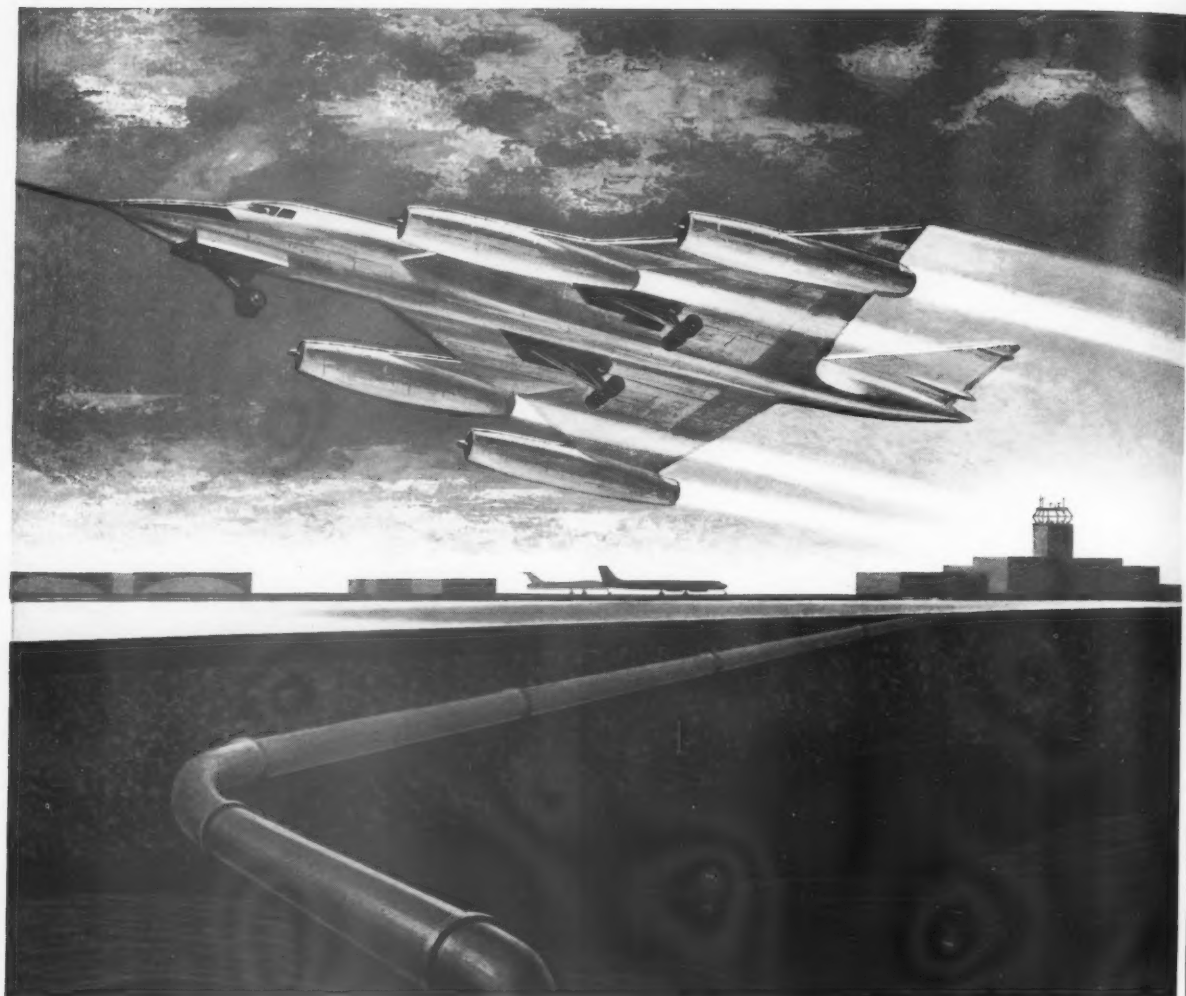


A Division of Heyden Newport Chemical Corporation
342 Madison Avenue New York 17, New York

NOVEMBER

1959

10c per copy



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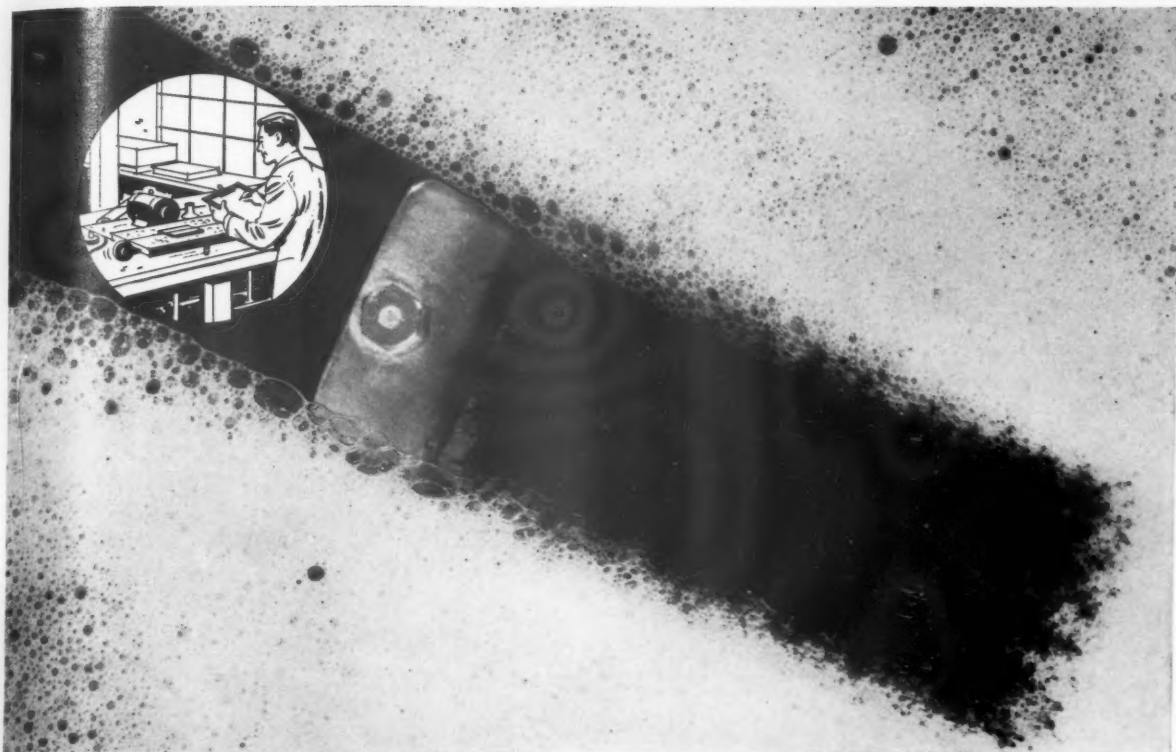
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NO. 12

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NEXT ISSUE

An interesting feature on the influence of pigment particle size and shape on the moisture permeability of organic coatings is scheduled for our December issue.

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EDITORIAL COMMENT

We Cannot Afford to Rest

IN his annual report to members attending the 72nd meeting of the National Paint, Varnish and Lacquer Association, President Joseph F. Battley predicted that paint sales for 1960 should surpass the two billion dollar mark. This prediction is based on the fact that the traditional and newly developed paint markets have been expanding in every direction. However, to realize this goal of two billion dollars requires greater sales effort on the part of paint manufacturers. He said:

"We have the products, the selling tools, the brains, the incentive, and this country is on the threshold of another boom era. What else do you need? If you will only put more hard selling into your operations, then reaching two billion dollars in 1960 will be much easier than reaching that first billion in sales. America's population is growing, America's industries are growing. America's needs for our products are growing. America is starting over one million new homes every year—and over fifteen million American homes have needed painting inside or out for the last five or six years.

"While hard selling must be a continuous process, the paint industry cannot afford to let up one bit on its program to make the American public more and more paint conscious."

In this connection, President Battley reviewed the Association's activities and programs designed to acquaint Americans of the attributes of paint and color.

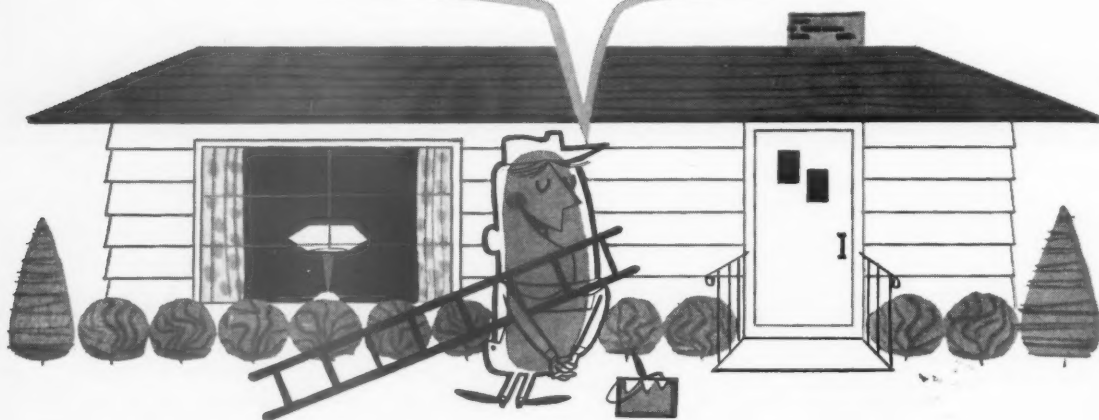
For example, the Association's Public Information Division has distributed over 670,000 "Here's How" booklets on painting problems. These booklets are distributed on individual re-

quests and the growing demand for them indicates new consumer interest and potential for increased sales. Furthermore, there has been a tremendous growth in the amount of technical information on new products furnished trade and consumer publications, students and educators, civic and social clubs, and business and trade groups. In addition radio and television have carried numerous items on the merits of paints over the past year. Thus, with public information and public relations programs, the Association has educated most of the public on the merits of paints and coatings, thereby creating both consumer interest and a desire to use paint.

During recent years, there has been a growing concern of substitute products that have cut into traditional paint markets. Among these are vinyl floor coverings, coated aluminum sidings, pigmented polyester laminates, etc. There is no doubt that these materials have an appealing effect, not only from the permanence feature, but in ultra-modern architecture and decor. It was brought out at the Advertising and Sales Promotion Managers' Forum that the predominant reason why people paint is because they want a change in color. In some respects permanence has been a disadvantage for substitute materials because people like a change every so often, especially color. Yet these substitute materials are making inroads and have blossomed during the past years through hard selling on their producers part. It is important that the paint industry educate architects and builders on the merits of paint by emphasizing color. As President Battley warned to paint manufacturers:-

"We cannot afford to rest on our laurels—nor 'mark time'. 1960 is the year you too must sell more of your own products."

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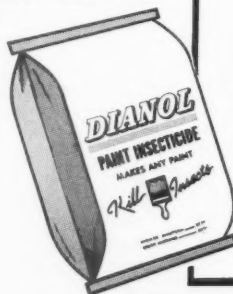
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*As reported in Official Digest,
Paint & Varnish Production Clubs, November 1956

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With HYLENE organic isocyanate you can achieve all of the end-product benefits characteristic of urethane finishes. For example, an 1820-foot section of a redwood bathhouse received three brushed coats of a urethane finish. Three coats of spar varnish were applied to the remaining section. Urethane finish and spar varnish were subjected to identical weather conditions and sunlight exposure.

At the time of application, both finishes had a similar appearance. But as the recent photographs demonstrate, urethane coatings display superior weatherability.

HYLENE offers unlimited versatility. It can be compounded into many variations of four basic urethane systems. It provides short-time, low-temperature reactions. And it is adaptable to your present alkyd processing equipment.

Du Pont research and technical facilities are available to you. To aid you in formulating HYLENE and polyhydroxy resins, Du Pont offers you technical assistance. Helpful

AT TIME OF APPLICATION (JULY, 1958)



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e finish outlasts spar varnish

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HOW URETHANE FINISHES AND SPAR VARNISH COMPARE

Properties	Urethane	Spar Varnish
Sward hardness	30-70	30
Tensile strength, psi	3000-7000	1200
Elongation at break, %	20-150	40
Gloss, %	98	95
Abrasion loss (Taber) (mgs per 100 revs)	40-75	220
Moisture vapor transmission (g/sq.in./day for film 10 mils thick)	130	55

PRESENT



REG. U. S. PAT. OFF.

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FINISHES**



Coating supplied by North Star Paint & Varnish Co. of St. Paul, Minn.

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Mr. W. A. Gerrard, Minneapolis Finisher

Checking one of his most recent Cargill Polyurethane 101 applications, Minneapolis Finisher W. A. Gerrard inspects the gymnasium of the new St. Joan of Arc Church, Minneapolis. The finish, applied in August, 1958, is "perfect," says Mr. Gerrard.

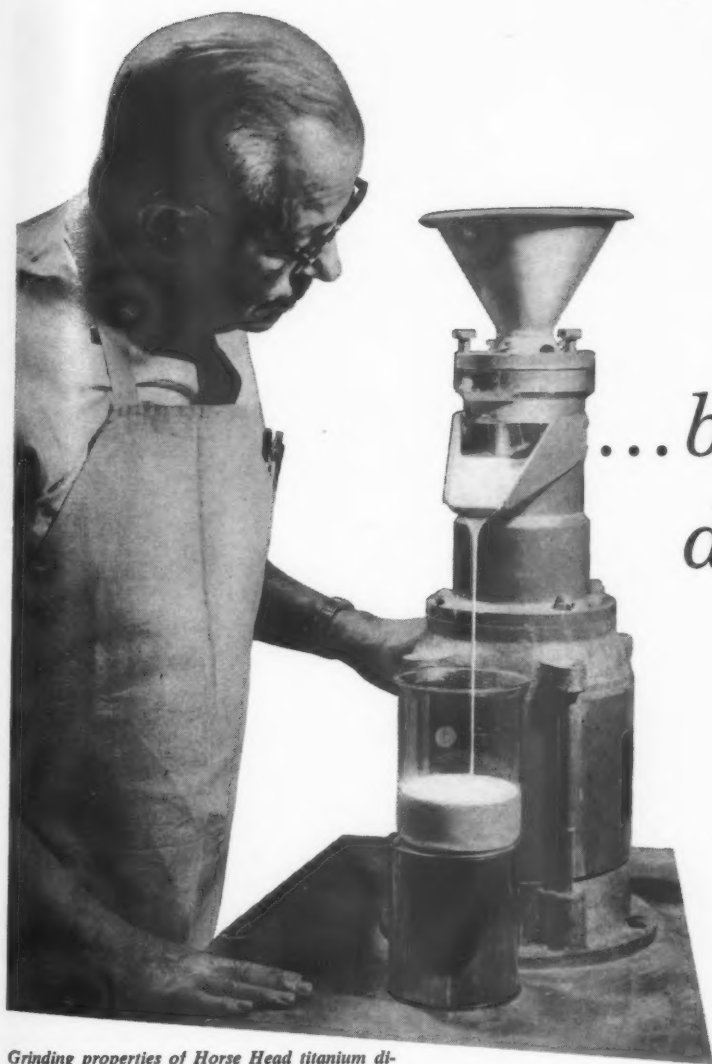
"I've been using Cargill Polyurethane 101 for over a year. I've applied it in hundreds of homes and three gymnasiums in different parts of the country. So far it's the best I've ever used. It works so much easier . . . gives you terrific coverage . . . stands up on the floor without soaking in . . . provides a good top coat . . . dries rapidly without lap marks.

"We are presently including it in all specifications issued to architects in the U. S. and Canada, because—after hundreds of applications—Cargill Polyurethane is the finest finish I've ever used." This is according to Mr. Gerrard, who has been in the floor finishing business for 21 years. Your formulation experience with Polyurethane 101 will be equally satisfactory.

Cargill Polyurethane 101 is a one-package oil modified polyurethane which is stable and provides the solubility, compatibility and film forming qualities the paint formulator needs. For specifications, suggested formulations and uses, write:

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is
kansas city,
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GOODYEAR

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with sales significance for you!

Turn the page for all the facts





The Kansas City Story

Economists call it a "growth area." Columnists call it "boom town." People who live there call it "K.C." But all of them will agree on one point: colorful, fast-climbing Kansas City is literally busting out all over.

Even Kansas City's hot summers don't seem to slow the furious forward pace that the whole area has set for itself. But it has caused plenty of trouble for masonry surfacing there. The air is not only hot (often in the upper 90's), but damp too (there's rain 106 days out of the year).

Photos courtesy Davis Paint Company, Kansas City, Mo.



NOTE: The Kansas City Story is the latest to join the long list of PLIOLITE S-5 "success stories" that mean Citi

Add the alkalis and moisture found in all masonry surfaces — and you begin to see why K.C. paint dealers were looking for a masonry paint that would produce more sales and fewer complaints.

Davis Paint Company came up with the answer: a paint based on PLIOLITE S-5, Goodyear synthetic resin. And Kansas City dealers can attest to the happy results. Example: many PLIOLITE S-5 paint jobs are lasting several years where other paints peeled, blistered or faded after only a

few months' exposure to K.C.'s sunny summers or wet winters.

This success story is being repeated in market after market where PLIOLITE S-5 formulations have been introduced. It can be repeated in your area, too. To start your PLIOLITE S-5 success story, follow the four simple steps on the next page.



at Kansas City, San Francisco, Galveston, Miami, St. Petersburg, Honolulu, Newfoundland, New York and the Great Northwest.



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you can make
the Kansas City Story
work for you—*

Launch your Pliolite S-5 Success Story with this proved **4-Step** Profit Plan

- 1 Get the full facts** on PLIOLITE S-5 from your Goodyear Chemical Division Representative.
- 2 Ask him to work with your Technical Staff** as it incorporates PLIOLITE S-5 into your own formulations.
- 3 When your formulations have been developed,** set up a meeting with your sales staff so that your Goodyear Chemical Division Representative can explain the 11-year success story of PLIOLITE S-5 and demonstrate the most effective methods of presenting PLIOLITE S-5 paints to your dealer organization.
- 4 When you're ready** to launch your promotional campaign, make sure you take advantage of the sales aids which Goodyear provides manufacturers who use PLIOLITE S-5.

*Best way to start your success story —
call your Goodyear Chemical Division Representative now!*



PLIOLITE S-5 BY

GOOD YEAR
CHEMICAL DIVISION

Pliolite—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio



FLAME TEST
Panel coated with X-37 and silicone based aluminum paint. Heat cured. Subjected to flame test. No film rupture.



QUENCH TEST
Sample panel heated 1000°F in muffle furnace, quenched in water. No film rupture.



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Same sample panel heated in muffle furnace cooled, bent over 1/4" mandrel. No film rupture.



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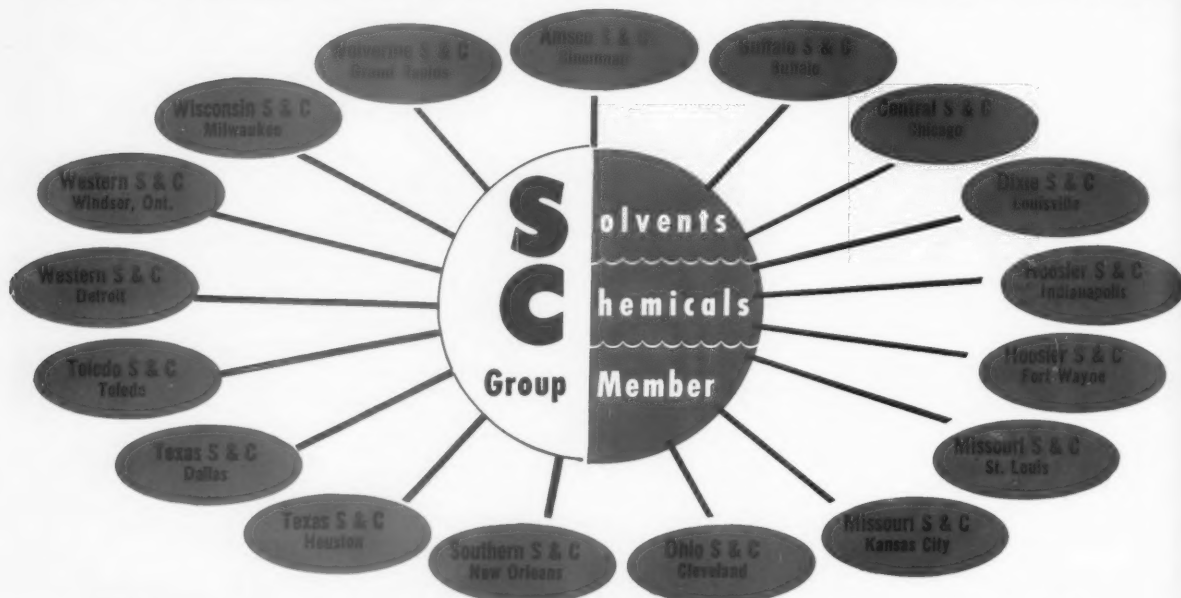
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CALCINED CLAYS

in

ORGANIC COATINGS

By
Harry B. Naylor*

CALCINED clays are a relatively new raw material to most paint chemists. However, they have been used quite widely in the paper, rubber and plastics industries for many years. Calcined clays found initial interest with the wire insulation manufactures because of their ability to impart excellent electrical properties and high physical strength to the insulation. Their low degree of water absorption was also a very useful factor here. Since calcined clays have a relatively high brightness, the paper industry found wide usage for them. Of special note was the boxboard industry, which found that calcined clays contributed a substantial amount of hiding to their coatings.

Since a general knowledge of calcined clays is not widespread, I feel that a portion of this paper should be devoted to a description of their method of manufacture and the chemistry and physics of the changes they undergo. I will endeavor to point this portion of

the paper to the paint manufacturer.

Calcined clays were developed in the mid 1930's, and have been greatly improved in the ensuing years. They are manufactured by heat treating normal hydrated Georgia aluminum silicates or kaolinites for an extended period of

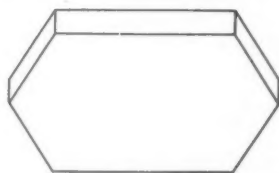


Figure 1. Particle shape of Kaolin. Kaolin occurs as a flat plate like particle as illustrated in Figure 1.

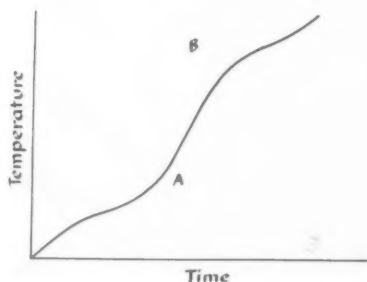


Figure 2. Reaction of calcining operation.

Calcining Operation

The calcining operation results in a two stage physical and chemical change in the clay. The reaction takes place as indicated in Figure 2.

As the cold kaolin is fed into the calciner, it increases in temperature at a non-uniform rate with time. Point A represents an endothermic release of chemically combined water. Point B represents an exothermic degradation of the cry-



Figure 3. Particle shape after calcining.

stal structure with a relatively large release of energy. These two changes result in a change in the individual particle as illustrated in Figure 3.

The chemical analysis changes are shown in Table I. The most marked change is that of the chemically combined water.

The other elements present only

*Southern Clays, Inc., New York, N. Y.

This paper was delivered at the Short Course in Paint Technology, University of Florida, Feb. 2-6, 1959.

	Hydrated Clay	Calcined Clay
% H ₂ O	13.87	0.03
% SiO ₂	45.52	52.30
% Al ₂ O ₃	38.46	45.26
% Fe ₂ O ₃	0.20	0.23
% TiO ₂	1.90	1.23
% CaO	0.02	0.04
% MgO	0.05	0.07
% Na ₂ O	0.02	0.03
% K ₂ O	0.02	0.02
% SO ₃	0.04	< 0.01
% P ₂ O ₅	< 0.01	0.02
% C	< 0.01	< 0.01
Total Soluble Salts	0.17	0.02

Table I. Chemical analysis of hydrated and calcined clays.

	I	II
Flat Alkyd Vehicle ("Faf")	650	650
Calcium Carbonate	135	—
Calcined Clay	—	135
Mineral Spirits	35	35
24% Lead Napthenate	8	8
6% Cobalt Napthenate	3	3
Anti Skinning Agent	1	1

Table II. Formulation of flat paints using calcium carbonate and calcined clay.



Figure 2. Comparison of calcined clay to a water washed fractionated calcium carbonate at about 25 PVC. I-calcium carbonate, II- calcined clay.

change in their relative proportion of the finished system. Also bear in mind, that although these various elements are reported as the oxides, they are present generally in other forms. Normally, the individual atoms are present as replacements for the aluminum and silicon in the original crystal lattice work.

The calcining operation has one important result and that is the formation of insoluble complexes from the formerly soluble ions. This is evidenced by the substantial increase in specific resistance of the calcined product as compared to the feed clay. Normal hydrated clays show a specific resistance in the range of 10,000 ohm, while calcined clays check as high as 100,000 ohms frequently.

Physically, calcined clays change in several respects from the feed material. They increase in brightness or total reflectance. Generally, this increase is 6-7 points on the General Electric reflectance meter. They completely lose their crystalline character. X-ray diffraction patterns indicate complete disorder within the clay particles. Surprisingly, the specific gravity and refractive index change very little during this process. At present, we have explanation for this fact.

Again, referring to Figure 3, it can be seen that the surface area of the individual particles increases tremendously accounting for the high water demand, vehicle demand and oil absorption associated with calcined clays.

Advantages

Generally speaking, the major advantage of calcined clays to the paint manufacturer is their ability to impart more opacity to a paint film than other materials normally included in the extender class. Figure 4 indicates the comparison of a typical calcined clay to a typical water washed fractionated calcium carbonate at about 25 PVC, which we feel is well below the dry hiding level.

Table II represents the formulas of the paints illustrated in Figure 4.

Based on our knowledge of the individual calcined clay particle and the observable increase in hiding as compared to both coarser and finer extenders, we have evolved a theory to explain this hiding increase.

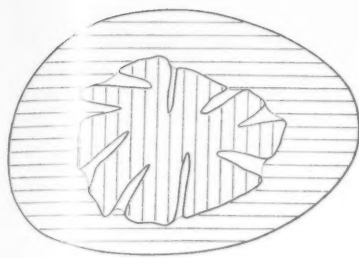


Figure 5. Particle of calcined clay immersed in vehicle.

As shown in Figure 5, when a particle of calcined clay is immersed in vehicle, the vehicle will not completely penetrate the pores or interstices.

We do not know the exact extent to which this vehicle will penetrate the pores and it seems to vary from vehicle to vehicle. However, at any time the condition of incomplete penetration exists, then pockets of air or areas of "captive porosity" exist. These voids will present a situation in which air-clay interfaces exist. These interfaces can and will exist at any PVC. It seems reasonable to assume that at higher PVC's, they will exist to a larger degree due to the lesser availability of vehicle through the competition of other particles for the existing vehicle. These air-clay interfaces will increase the light refraction of a film in the same manner as "dry hiding." However, none of the poorer characteristics associated with exposed particles will exist since these areas of "captive porosity" can be entirely contained within the vehicle film.

The foregoing is a theory which seems to fit the existing facts. Some people are not in entire agreement with this theory, however, the increase in hiding and the relatively low refractive index are easily confirmed facts.

Formulations

Regarding the use of calcined clays in practical paint formulation work, I will attempt to break this usage into two main groups: 1. Emulsion Paints, and 2. Solvent

Systems. In each of these groups, I will attempt to cover some of the sub-groups.

Emulsion Paints

The initial interest in calcined clays centered with the emulsion paint manufacturer. There was much experience and data available on various emulsion coatings involving calcined clays, which the paper industry used. In addition, the hiding power of calcined clays is more pronounced in emulsion systems. This is explained by the fact that the individual resin particles generally are as large or larger than the pores in the clay particle and, consequently, a very low degree of vehicle penetration occurs.

Because of the high binder demand of calcined clays, we discovered very early that we were limited in the amount of calcined clay which we could use in a given formula. In general, we found that in order to produce a formula which had good qualities for an interior flat trade sales paint, we must limit the calcined clay to 1.50 pounds per gallon. We found that this figure can be varied somewhat depending upon the specific emulsion vehicle and the quality of the finished paint which is required.

As we are all aware, there is a definite market for a paint at a price where quality becomes secondary to price. In this type of product, large quantities of calcined clays can be used in order to capitalize on the remarkable hiding they contribute at a low cost. However, we will concern ourselves primarily with good quality paints.

The finer particle sized vehicles such as Rhoplex AC-33, will tolerate as much as 2.00 pounds per gallon with excellent properties. Occasionally, when using a very coarse emulsion and other high binder demand materials, the calcined clay must be reduced even below 1.50 pounds per gallon.

Excessive use of calcined clay quickly shows itself as the stain removal and enamel holdout of the paint falloff. When a situation

exists, wherein a large number of these porous particles protrude through the surface, then they will tend to collect dirt and stains in the pores, and these stains may be removed only by removing the particle itself. These protruding porous particles also present a very absorptive surface to any enamel topcoat. Thus, excessive use of calcined clays cannot be tolerated in primers although a proper balance produces a primer to which the topcoat adheres very firmly.

When used properly, the calcined clay will contribute a substantial amount of hiding to a paint film. In addition, the rough particle contributes excellent mechanical durability to a paint film. In one case, in a typical vinyl acetate paint, the addition of one pound of coarse calcined clay to the formula tripled the scrub resistance.

We initially found some difficulty with color dispersion when using calcined clays, however, a small addition of potassium tri-poly phosphate has been found to do an excellent job. 0.75% potassium tri-poly phosphate on the weight of the clay usually satisfies the dispersant requirements. However, this naturally varies from formula to formula and is primarily dependent upon the other extenders present.

The pH of calcined clays is 6.0-6.2 and is completely unbuffered. Thus, although calcined clays contribute very little or nothing to the buffering of an emulsion paint, they can be adjusted to any pH and maintained there with a slight addition of an alkaline material. The reaction is instantaneous, not a function of time as is the case of many extenders including hydrated clays. All other things being equal, there will be no drift in pH caused by calcined clays.

The viscosity of emulsion paints made with calcined clays will tend to increase overnight as much as 10 Krebs Units and there can be expected an additional increase of several units over a period of a week. After this, we have noticed no increase in viscosity over periods up to one year. The initial viscosity pickup is slightly higher than with other extenders, but we have

not found it objectional. The viscosity increase will remain quite constant within a given system time after time.

Brushing of an emulsion paint is materially helped by the use of hydrated clays. This is accounted for by the thixotropic rheological properties induced by this type of extender and also by the extremely fine platey particles.

Calcined clays will produce thixotropy, however, as we have seen, the particles are no longer platey, but quite rough and this will lessen the slip. However, since we are limiting the use of the calcined clay in the formula and since these are extremely fine particles in the range of 1 micron, this resistance to slip is not a great problem and often goes unnoticed.

Settling of calcined clays in emulsion paints is not a problem. Generally, the paint is quite heavy bodied in the can and only becomes fluid under shear. This, of course, virtually eliminates the settling problem of any material.

We have noticed that with an excess of calcined clays and with a paint below 70 Krebs Units in viscosity, settling does occur. However, the sediment is easily redispersed.

The stability of emulsion paints is of major concern. Many factors affect their can life including can linings, proper wetting and dispersing agent balance and the pigmentation, to mention a few. Calcined clays, because of their extremely low soluble salt content, are of interest in this direction. Soluble salts can effect the scrub resistance of the film, the color retention with washing and the stability of the emulsion itself. As mentioned earlier, the specific resistance of calcined clays will check as high as 100,000 ohms and will be consistently above 60,000 ohms. This is in contrast to the 10,000 ohms and lower for many pigments and extenders. Thus, calcined clays will enhance the natural stability of any system.

Solvent Paints

In solvent type paints, including alkyds, oleo-resinous and straight oil paints, calcined clays present

most of the advantages outlined for emulsion type paints.

However, the hiding advantages are not as pronounced due, we feel, to the greater degree of vehicle penetration into the pores of the individual clay particle leaving smaller and less numerous areas of "captive porosity."

The same rule of thumb regarding the quantities of calcined clays to be used applies here as in emulsion systems. 1.50 pounds per gallon seems to be the top limit in quality paints. This is dependent upon the vehicle, but rarely can the usage be extended as high as 2.00 pounds per gallon.

In interior flat paints, the calcined clays will present roughly the same viscosity buildup as in emulsion systems. Dispersing agents or grinding aids are not necessary. Leveling is a small problem when excessive amounts of calcined clays are used. However, these materials will give thixotropic properties to a paint. Again, if excessive quantities of calcined clays are used, the yield point can be too high and the rate of thixotropic setting too fast to allow the paint film to properly level. Although this property of calcined clays can be annoying, it also can be quite useful in paints, which tend to sag or run. Here, a controlled addition of calcined clays can give a paint with the desired rheological properties. As in emulsion paints and the rubber industry, it is found that calcined clays reinforce the alkyd paint film and give excellent wear resistance or scrub resistance. Again, excessive use of calcined clays promotes a condition of poor stain removal. The low level of soluble salt content will increase the salt spray resistance of paint systems.

In exterior paints, our data is limited, however, we have noted several characteristics of calcined clays in this area. Of course, a substantial increase in hiding can be expected with these materials. Calcined clays will chalk, this will maintain the film quite white and bright for up to two years. At this point, there is a rapid buildup of

dirt and the paint compares unfavorably with other systems. The durability, today, after three years seems good on several paints in spite of the dirt collection. However, with proper formulation and further reductions in the amount of calcined clays, the dirt collection problem will be solved while still being able to capitalize on the increased hiding of the calcined clays.

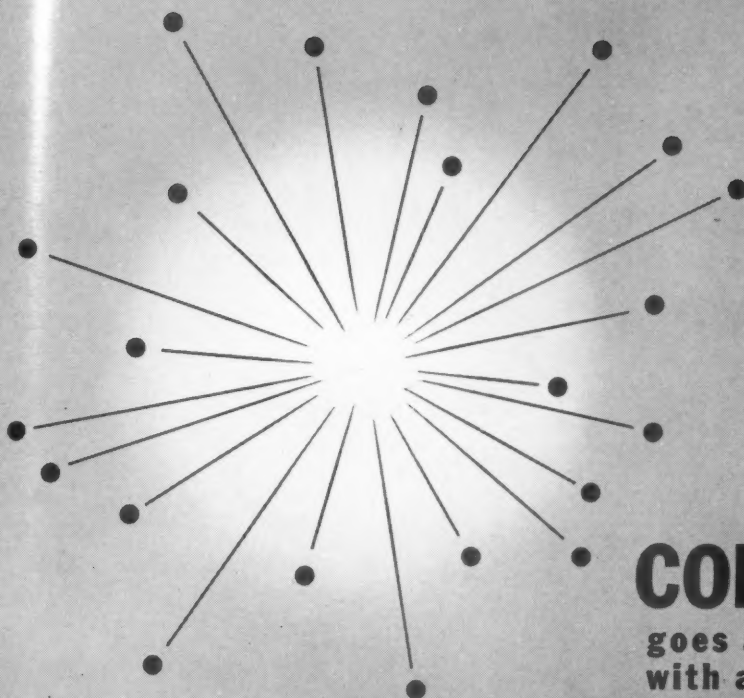
In considering what has been said above about both water and solvent systems, please bear in mind that there are two grades of calcined clays. In addition, these remarks are predicated upon Al-Sil-Ate W and Al-Sil-Ate O, products of Southern Clays, Inc. There are other grades of calcined clays on the market in varying degrees of availability. Clays from these other sources can and will give different results.

Al-Sil-Ate O is a fine particle sized calcined clay with an average particle size of .8 microns. Al-Sil-Ate W is coarser with an average particle size of 1.2 microns. The finer grade has been shown to work poorly in the high PVC emulsion paints, particularly vinyl acetate. The higher binder demand of Al-Sil-Ate O decreases the scrub resistance substantially and thus makes this product undesirable in spite of its higher hiding.

In summing up the major advantage of calcined clay as extenders, is their ability to impart some hiding to a paint film at a low cost. The other useful properties include their ability to impart thixotropy to a paint film to help sag problems and the increase in mechanical durability of a paint film.

The major disadvantages seem to be stain removal and enamel holdout. In both cases, the solution is the limitation of the amount of calcined clay used. Generally, this limitation is 1.50 pounds per gallon.

It is felt that calcined clays are a new material which will find wide interest in the paint industry. It is hoped that what I have had to say will provide you with sufficient basic recommendations to enable you to incorporate these materials in your work or to find wider usage for them.

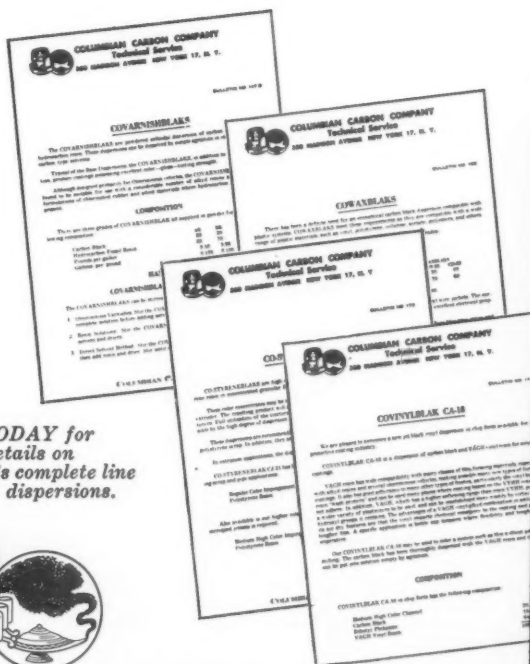


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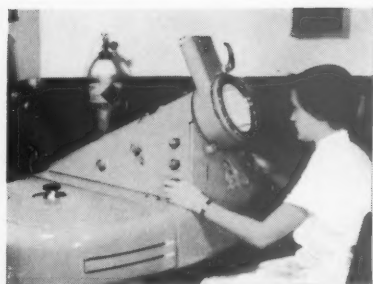
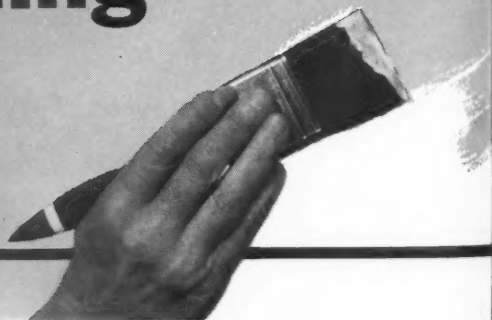


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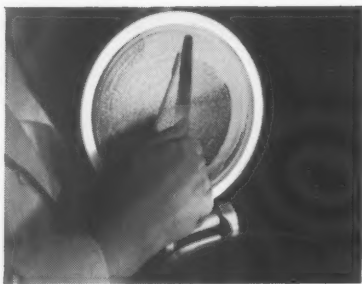
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DETERMINATION OF ROSIN in PROTECTIVE COATING VEHICLES

Part I

By
Frank Spagnola*

Initial Research by Group 7

In March 1952, Group 7 completed a preliminary round-robin on qualitative and quantitative tests for rosin. Five samples of coating vehicles of widely varying compositions were analyzed for rosin content by six collaborating laboratories. The qualitative tests consisted of the Liebermann-Storch and Halphen-Hicks Tests respectively. The results of these tests showed poor agreement among different laboratories. Some laboratories obtained positive tests, and others negative tests on the same samples. In some cases positive tests were obtained where no rosin was present. The quantitative test consisted of diluting the clear coating with petroleum ether, extracting with dilute H_2SO_4 to remove metallic constituents, evaporation of the ether, saponifying with 0.5N methanolic-KOH, and then preferentially esterifying the fatty acids with 1:4 H_2SO_4 -methanol. The fatty acid esters and rosin acids were then extracted with petroleum ether, after adding 7-10% NaCl solution, washed free of H_2SO_4 , and the free rosin acids titrated with standard NaOH using phenolphthalein after the addition of neutral isopropyl alcohol.

The results obtained were generally erratic. All of the collaborators obtained positive values on two of the samples which did not contain any rosin. From the data obtained it was not possible to arrive at any definite conclusions, and future experimental work was held in abeyance pending related work then being done by Committee D-17 on Naval Stores.

Initial Proposal of a High Temperature Saponification Method

In March 1954, the writer submitted to Group 7-Subcommittee IX, a proposed method for determining

The purpose of this paper is to present to industry as general information, a report on the activities of A.S.T.M. Group 7 on Rosin Content, Subcommittee IX, Committee D1.

The members of Group 7, after considerable research have developed a "Tentative Method of Test for Total Rosin Acids Content of Coating Vehicles", unmodified by such materials as phenolics or maleic anhydride. (A.S.T.M. Method D 1469-58T) Research is still under way on widening of scope to include modified products.

Working in collaboration with the A.S.T.M., J. S. McNulty and E. J. Brewer of the Battelle Memorial Institute, have developed a similar method applicable to unmodified materials and based on a procedure originally proposed by the writer to the A.S.T.M. in March 1954. Permission to publish the Battelle Report has been granted, and their data is included in this report.

It is hoped that publication of this paper will stimulate industry to evaluate the method, submit suggestions, and initiate further research on a method applicable to modified vehicles.

rosin in varnishes. This method formed a basis for the Battelle research work, and will be described in Part II (December issue.)

The proposed method consisted of: saponifying the sample with diethylene glycol-phenetole-KOH, extracting unsaponifiables with benzene, acidification and extraction of the acidic fraction with ether, selective esterification of the fatty and dibasic acids with methanolic H_2SO_4 , extraction with ether after adding aqueous Na_2SO_4 , and determining the unesterified rosin by either of three proposed methods:

- A) Alkalimetric Titration—using phenolphthalein indicator
- B) Alkalimetric Titration—using a pH meter
- C) Colorimetric Analysis, according to Swann's method. (2)

*National Lead Co., Research Laboratories, Brooklyn 1, N. Y., Chairman A.S.T.M. Group 7 on Rosin Content, Subcommittee IX, Committee D1.

Swann's method is subject to limitations in that certain types of heat-treated rosins and hydrogenated rosins, fail to give a color with acetic anhydride-sulfuric acid reagent. In some cases, vehicles which do not contain rosin can give false positive color reactions.

This proposal was discussed in detail at the June 1953 meeting of Group 7 and many helpful criticisms were contributed by the group members. It was generally agreed that this method, while applicable to the simpler types of resins would not be applicable in the presence of various modifiers such as rosin-maleic adducts and phenols. It was decided therefore, to give some thought to a method of universal applicability.

A review of existing knowledge was made. Various ideas on a practical solution to the problem were suggested and incorporated in a report to Group 7 in August 1954. A review of this report follows:

**Review of Report to Group 7
August 1954 on Existing Methods and
Possible Solutions to the Problem**

*Quantitative Methods for Determining
Rosin in Various Products*

a. Herrlinger and Compeau (1) summarized the most widely used methods for determining rosin acids in fatty acids, and developed a method for the determination of rosin in the 0-15% concentration range. This method was adopted as A.S.T.M. Method of Test D 1240. In this test, the sample is dissolved in methanol, sulfuric acid is added, and the fatty acids are preferentially esterified by refluxing. After cooling, the mixture is poured into Na_2SO_4 solution and the quantitative transfer complete with ether. After shaking, the aqueous layer is withdrawn and the ether layer containing the unesterified rosin acids and fatty acid methyl esters is washed free of H_2SO_4 . The washed ether layer is then titrated, after the addition of ethanol, with standard alcoholic—KOH using phenolphthalein indicator. In calculating the rosin acids content, algebraic correction factors are applied,*based on actual experiments with known mixtures. This method permits the determination of rosin acids to within $\pm 0.1\%$ in the 0-15% range.

b. A.S.T.M. Method D803-55T includes three procedures for determining the rosin acids number of Tall Oil.

1) In the "Potentiometric Referee Method", the sample is dissolved in methanol, methyl-sulfuric acid solution is added, and the mixture refluxed. After cooling, methanol is added, and the unesterified rosin acids are titrated potentiometrically against standard alcoholic—KOH solution. 2) In the "Modified Wolff Method" (Alternate Method A) the sample is treated as described above, but the unesterified rosin acids are titrated using thymol blue indicator, and the addition of methanol prior to titrating is deleted. 3) In the "McNicholl Method" (Alternate Method B) the fatty acids are preferentially esterified by refluxing with ethanol in the presence of B-naphthalene sulfuric acid catalyst. The unesterified rosin acids are then titrated with standard alcoholic—KOH using thymol blue indicator. The potentiometric method is used where the most reproducible results are desired, while the modified Wolff and McNicholl methods are used where only approximate results are desired.

c. Swann (2) has published a colorimetric method

for determining rosin, rosin soaps, esterified rosin, and modified rosin products, in various vehicles, based on the formation of a violet color with sulfuric acid-acetic anhydride reagent. According to Swann, free rosin or rosin soaps can be determined quantitatively in any vehicle except cellulose lacquers. The quantitative determinations of esterified and modified rosin products is limited to non-alkyds and samples in which the rosin has been completely esterified. Simple qualitative tests are included to determine if the procedure is applicable. In determining the free rosin or rosin soaps, the color formed in benzene solution is extracted with 50% H_2SO_4 , measured in a colorimeter, and compared to a calibration curve prepared from "purified" rosin. For determining rosin ester, the color in benzene is compared to a series of freshly prepared aqueous KMnO_4 standards, the color of which has been previously compared to known concentrations of esterified rosin products in benzene solution, treated with the $\text{H}_2\text{SO}_4\text{-Ac}_2\text{O}$ reagent. The color formed in the latter case is very unstable, and must be read within 14 seconds.

d. A.O.C.S. Methods Da 12-48 and Db11-48, are applicable for the determination of rosin in soap and soap products. After hydrolysis of the soap with acid, and isolating the rosin fatty acid mixture, the rosin content is determined by the McNicholl method.

e. Ball and Vardell (3) published a spectrophotometric method for the analysis of tall oil rosin acids, based on the preferential precipitation of the rosin acids as the cyclohexylamine salts, regeneration of the free rosin acids with boric acid, and then obtaining the ultraviolet spectra in ethanol. The yield of isolated total rosin acids was about 95% of theoretical. From the ultraviolet spectra they were able to calculate the amount of abietic type acids present, (abietic and neo-abietic acid) which comprise from 40-60% of the total rosin acids. As stated by the authors, no method has yet been published to accurately determine the non-abietic type acids of rosin by spectrophotometric means.

f. It was not the purpose nor was it possible in this writing to review all of the analytical methods published on rosin determination, the majority of the known methods being modifications of those already mentioned. In the following sections of this report, are included ideas obtained by the author from various persons who had done work on the problem, or were interested in contributing toward the development of a reliable method for determining rosin in varnishes.

Basic Factors Relative to the Design of a Universal Method.

It was believed that a practical approach would consist of the following:

- A. Saponification of the sample
- B. Extraction of Unsaponifiable Matter
- C. Acidification and Isolation of the Acidic Fraction
- D. Chromatographing the Acidic Fraction into its various components
- E. Determination of the rosin (and/or rosin-maleic adduct) in the eluted fractions by alkalimetric titration.

Each of the above steps is discussed below in detail.

A. Saponification

Ethanol-KOH will saponify a large majority of esters, including those of dibasic and fatty acids. Metallic-rosinate driers are also quantitatively saponified by this reagent. However, rosin esters are incompletely or only partially saponified, in which case it is necessary to use KOH in higher boiling solvents such as ethylene or diethylene glycol, Carbitol etc.

Shaeffer and Balling (4) developed a method for saponifying rosin esters which gives essentially theoretical values for rosin esters. This method employs 0.8N KOH in diethylene glycol-phenetole, the purpose of the phenetole being to provide an inert vapor "blanket" during the saponification.

B. Extraction of Unsaponifiable Matter

After saponification, the mixture may be diluted with water and extracted with ether or benzene to remove the unsaponifiable matter. The amount of water used for the dilution should be generous in quantity to prevent any emulsion difficulties upon subsequent extraction with ether or benzene. At this stage benzene may be preferable to ether in the presence of modifiers such as polystyrene.

C. Acidification and Isolation of the Acidic Fraction

The remaining aqueous layer may then be acidified with hydrochloric acid and extracted several times with ether, the combined ether extracts washed free of mineral acid, and evaporated to dryness on a steam bath under nitrogen.

The Wolff and McNicholl type methods for determining rosin in admixture with fatty acids, are based on the "preferential" esterification of the fatty acids with methanol, and titrating the unesterified rosin acids. However, if the sample contains a rosin-maleic adduct, a fatty acid-maleic adduct, or phenol modifiers, difficulties are encountered. One of the maleic acid carboxyls is easily esterified, while the other is very difficult to esterify. In these methods therefore, a large part of the maleic modifiers would be titrated as rosin acids.

Phenolic modifiers also interfere.

The chemistry of phenolic modified resins is still less clearly defined, and very little is known as to how phenolics react in alkyd resins or with rosin acids. Some mechanisms have been suggested by Powers (5) but without a more definite knowledge of the chemistry involved, and without definite experimental data, it cannot be ascertained what effect phenolics will have on any scheme of separation.

D. Chromatography of the Acidic Fraction

It has been suggested that in order to achieve a method of universal application, a means of separating the rosin acids or the rosin maleic adduct from other components would be highly desirable. Chromatographic absorption of the acidic fraction on a support such as silicic acid, activated carbon, or cellulose, and subsequent washing with solvents of increasing polarity, would be a desirable starting point.

The specific method of chromatography to be used for isolating the rosin and rosin-maleic adduct would have to be determined by actual experiment. Several publications which should be of much help are those of Cassidy (6) on "Absorption and Chromatography," Zechmeister (7) on "Progress in Chromatography 1938-1947", Holman et al (8) on "Progress in the

Chemistry of Fats and Other Lipids", C. Mader (9) on "Chromatography of Organic Acids", and the Symposium on Chromatography" (10).

Elution of the absorbed material with solvents of progressively increasing polarity may give the best separation. With respect to the latter, the apparatus should be so designed that the change in polarity is gradual, rather than abrupt in order to effect maximum resolution. Mader (9) describes the construction of such an apparatus. It is suggested that chromatographic experiments be done on synthetic mixtures containing known compounds before attempting to analyze actual resins or varnishes. It also should be kept in mind that since this method would be used by the industry as a routine method of test, the chromatographic technique should be such that it can be run without elaborate precautions or undue expenditure of time.

E. Determination of Rosin Content in the Eluate Fractions

In a chromatographic procedure whereby the rosin acids or rosin maleic acid adducts are clearly separated from the other constituents, it should be possible to determine the rosin by simple alkalimetric titration of the fractions as they are progressively eluted from the column. To illustrate: As the elution proceeds, each successive 5 or 10 ml of eluate could be titrated with standard alcoholic-KOH as it flows out of the column. Then by plotting the volume of alkali consumed versus the volume or fraction number of the eluate, and from a previous knowledge of the order of elution of each component, (determined by experiment on synthetic mixtures) the rosin content could be calculated.

Although the chromatographic technique seemed to offer a possible solution to the problem, the majority of Group 7 felt that such a procedure would be time consuming and require complicated equipment. Activity was therefore directed toward titrimetric procedures.

Separation of Rosin from Fatty Acids with Cyclohexylamine

In 1955 some experimental work was done on separating the rosin acids from other organic acids, such as would be found in coating vehicles, by preferential precipitation with cyclohexylamine from an acetone solution. This method was unsuccessful and therefore abandoned.

In May 1955, the writer met with Dr. A. Pollak, acting as liaison between A.S.T.M., Battelle, and the Pulp Chemicals Assoc. At this meeting a modified method was drawn up which included most of the favorable ideas and suggestions submitted by those who had done work on the problem. This method was identical to the newly Proposed Tentative Method of 1957 which is described at the end of this report.

Originally, the Herrlinger Compeau (1) Correction factors were used in the equation for calculating rosin contents. Later Subcommittee IX voted to delete these from the methods, since values close to theoretical were obtained without these factors, on an unmodified alkyd sample.

The second round-robin was run using the above method. Five samples were used for the test. The composition of these samples is given in Table 1.

Table 1. Composition of five samples used in second round-robin run.

Sample#	Composition	Nominal % Rosin Acids * (Nonvolatile Basis)	% Solids	% Maleic- Anhydride Nonvolatile Basis
1)	phthalic alkyd, made with low rosin content tall oil, modified with maleic anhydride adducted to rosin.	0.52	51.9	0.60
2)	phthalic-pentaerythritol-refined tall oil-soya alkyd	4.23	48.3	none
3)	phenolic modified rosin varnish	2.59	52.2	none
4)	maleated soybean oil	none	100.0	unknown
5)	maleated soybean oil with tallate driers added	0.48	99.3	unknown

*Calculated as abietic acid M.W. 302.

Table 2. A.S.T.M. Group 7 - Sub. IX - Rosin Content Second Round-Robin - 1955*

	#1 phthalic alkyd- low rosin tall oil, containing rosin- maleic adduct	#2 phthalic - P.E. refined tall oil soya alkyd	#3 phenolic rosin varnish	#4 maleated soybean oil	#5 maleated soybean oil plus tallate driers
Theoretical % Rosin N.V.B.	0.52	4.23	2.59	none	0.48
Laboratory & Method					
A Thymol Blue	1.5	4.0	13.1 12.6	5.7 5.5	6.2 6.0
B Thymol Blue	1.6 1.7	4.6 4.6	15.6 15.1	3.8 3.7	5.6 5.7
C pH meter	1.4 1.4	3.9 3.9	8.2 8.7 2.7 8.1 7.4	2.9 3.2 3.2	3.9 3.9 4.2
D Thymol Blue	1.8	4.1	14.8	5.5	5.9
E "Alkacid" Paper	1.2 1.2	4.7 4.6	3.2 3.2	0.7	1.3 1.3
F Thymol Blue	1.4 1.5	3.9 3.8 4.0	11.0 10.0 10.8	5.5 4.7	5.2 5.3
F pH meter	1.4 1.5	4.0 3.9 3.8	11.0 9.9 10.6	4.4 4.0	4.1 4.8
G Thymol Blue	1.6 1.6	4.6 4.5	too dark too dark	4.8 4.8	5.1 5.1

*Method used was identical to that described at end of this report, "Proposed Tentative Method of Test for Rosin Acids Content of Coating Vehicles" A.S.T.M. D-57T.

The results obtained in this round-robin are shown in Table 2.

Third Round-Robin — 1956

The data in Table 2 show that phenol and maleic modifiers seriously interfere. At this point, effort was directed toward by-passing these interferences. It was thought that if the final titration of unesterified rosin acids were done with a pH meter, and the titration curves plotted, the inflection point for the rosin acids could be distinguished from that of the phenols or maleic, if the respective pH values of the individual components differed sufficiently.

A set of samples similar to those used in the second round-robin was obtained from the same supplier. The collaborators were instructed to submit the titration curves showing pH vs ml titration. While run-

ning the titrations they were also asked to check the pH during titration with pH paper. All titrations were to be taken to a finale pH of 12 or 13, and the rosin contents calculated from a) pH 10.5 endpoint b) inflection point c) weakly basic pH paper end point.

The following results were obtained by these collaborating laboratories:

A Beckman Model H2 pH Meter was used. The pH paper endpoints were found to lie on the horizontal slope of the titration curves. This could introduce a large error unless pH paper tests are made after very small incremental additions of titrant. The inflection points obtained with the meter coincided very closely with phenolphthalein endpoints. Calculation of rosin content from the pH inflection points gave results which were slightly higher than results calculated from the titration at pH 10.5.

The percent of rosin acids in each case was calculated as abietic acid (molecular weight 302) as follows:

$$\frac{\% \text{rosin acids}}{\text{non-volatile basis}} = \frac{\text{ml titration} \times \text{normality} \times 30.2}{\text{grams non-volatile solids taken}}$$

This formula was used to calculate the rosin acids contents shown in Tables 3-5.

Table 3 - Laboratory A Data

Sample#	% Rosin Acids Calculated from:		
	"Hydriion Paper" Endpoint	pH 10.5 Endpoint	Inflection Point
1	0.80	1.50	1.56
	—	1.18	1.24
2	1.23	3.02	3.26
	0.71	3.12	3.26
3	0.93	11.70	no inflection
	1.46*	11.40*	no inflection
4	2.29	5.66	5.81
	1.34*	4.69*	4.76*
5	3.16	8.61	8.75
	—	7.41*	7.41*

(* 0.5 normal KOH used in these cases)

(0.2 normal KOH used in all other cases)

Table 4 - Laboratory B Data

Sample#	% Rosin Acids Calculated from:		
	Alkacid Paper Endpoint	pH 10.5 Endpoint	Inflection Point
1	1.66	1.74	1.74
2	4.35	4.42	no inflection
3	12.13	12.20	no inflection
4	4.88	4.95	no inflection
5	6.00	6.07	5.79

Table 5 - Laboratory C Data

Sample#	% Rosin Acids Calculated from:		
	"Hydriion" paper Endpoint	pH 10.5 Endpoint	Inflection Point
1	0.89	1.22	1.32
2	0.89	3.32	3.46
3	1.00	11.50	no inflection
4	3.67	4.55	4.72
5	3.82	5.36	5.39

From the data obtained by all three laboratories, it was again apparent that modifiers such as maleic and phenolics interfere, as previously shown in the second round-robin. The general average percent rosin acids obtained for Sample #2 in the third round-robin, indicated that this batch contained a lower amount of rosin acids (3.5% average) as against 4.25% average for the first batch used in the previous tests. The use of pH paper apparently gave erratic results. In general, calculation of percent rosin acids from either pH 10.5 endpoint or inflection point, gave results which were in close agreement. In some cases, no inflection was observed, therefore, titration to a specified pH endpoint is necessary when using the pH meter.

No separate inflection points were noted for components other than rosin.

Future Work

Until a universal method becomes available for application to modified materials, effort is being concentrated on getting additional data for the present method. Projected work for 1957 includes the analysis of a wide variety of coating vehicles and method refinement.

Battelle Report on Rosin Acids Analysis

A final report of rosin acids analysis to the Tall Oil Association from the Battelle Memorial Institute was given by J. S. McNulty and E. J. Brewer on March 15, 1956. This report is here with reprinted.

Rosin has been excluded from many varnish and alkyd vehicles because no adequate test has existed for its quantitative analysis in such products. For example, many Government specifications prohibit the use of any rosin as detected by the very sensitive Lieberman-Storch test even though it is generally accepted that small amounts of rosin are not detrimental but may, in fact, be advantageous.

Even the most carefully fractionated tall oil fatty acids contain sufficient rosin to be detected easily by the Lieberman-Storch test. Therefore, the Tall Oil Association is interested in developing a method whereby quantities of rosin in the order of 0.5 to 5.0 per cent in vehicles such as alkyds can be readily determined quantitatively. Were such a method available, it would specify a maximum allowable rosin content which would permit use of tall oil fatty acids in alkyds such as those covered by Specification No. 52R13.

A method for such a determination was proposed by Spagnolo to Group 7 of Subcommittee IX of A.S.T.M. Committee D-1 in March 1954. To help speed action on this proposed method, the Tall Oil Association requested Battelle to evaluate it.

This brief study has shown that reliable results can be obtained for the analysis of alkyds containing from 0.5 to 5.0 per cent rosin.

Summary

Preliminary study of the "Spagnolo" procedure (given in detail in Appendix A*) indicated that a number of modifications should be considered to improve as well as shorten it. Several variations of the procedure were, therefore, studied. It was shown, particularly, that modifications to bring the final determination of the rosin acids in the rosin-fatty acid mixture more in line with the Herrlinger-Compeau method were very desirable. Other simplifications were also made.

The method as modified has been shown to give reasonably accurate and precise values for rosin in alkyds.

(Turn to page 106)

*Editor's Note: This is the procedure first proposed to the A.S.T.M. in March 1954. The newly proposed A.S.T.M. method will appear in Part II.

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THE COATING CORNER

By
Phil Heiberger

The author continues his random reflections on various aspects of the paint industry. The opinions expressed in this column are his alone and do not necessarily reflect those of this publication.

Picking Up the Threads

LAST month we discussed some problems affecting the alkyd position in the paint vehicle hierarchy. It was noted that while alkyds appeared as usurpers of the established role of oleoresinous varnishes a few years back, today they are being threatened in turn by newer vehicles. The following question was raised: If more were known about alkyds, might they perhaps prove superior to their powerful new challengers?



P. Heiberger

The Certainty of Change

Certain parallels can be drawn. We are living in a period of rapid transitions in both our technical and non-technical worlds. While several "workhorse" vehicles are contending for primacy, other changes are occurring in practically all areas. It has been said that nothing is certain but death and taxes. A third certainty is change.

It's interesting to observe the

pattern individuals follow in their reaction to the perennial phenomenon of change. There are those who enthusiastically embrace it (the minority) and those who vigorously fight to stave it off (the majority). Yet, despite its ardent proponents and stubborn opponents, change continues to impose its rigors at a pace that suits only itself.

Equilibrium

The problem of maintaining equilibrium is a universal one. In both physical science and social science, a system in equilibrium tends to remain in equilibrium and any change is met with resistance. It is not surprising, then, to observe that many people regard change, any change, with suspicion, hostility, and resentment. Change threatens security based on repetition of the familiar; it disturbs equilibrium, disrupts continuity, and destroys organization. Yet it is recognized that change also can bring progress and improvement and frequently implies reorganization at a higher level.

Habit Lag

Many people, being creatures of habit, tend to develop deep affection for "tried and true" habit patterns of both thought and action and cling tenaciously to them even when reason, logic, and altered conditions of life dictate the wisdom of discard. When compared to future uncertainties, present circumstances, despite their disadvantages, often become strangely attractive. There are a few lucky people, it's true, who manage to wiggle through one transition after another and emerge not only unscathed but fortified. There are many others, however, less fortunate, who allow indecision caused by conflict to sap their energies. Probably the largest group is comprised of those who accept changes nominally, but soon find themselves reverting to their old habits.

These tendencies, readily observed on both the home and the industrial scene, help to explain why valuable innovations involving new processes, products, sales techniques, packages, or theories, are rarely accorded immediate unqualified acceptance. History shows that, be he Galileo, Pasteur, Darwin, Freud, Rickover, or Joe Doakes, the innovator's lot is not likely to be a happy one.

Obstacles to Innovations

Most readers of this magazine have been involved in some of the many recent innovations in the paint industry and can recall the typical resistance patterns. The confusion accompanying the introduction of nitrocellulose, tung oil, alkyds, epoxies, emulsions, latices, titanium dioxide, two-pot systems, and sand grinding are a few cases in point. Despite recognized and acknowledged need of these once novel products or processes, the initial failures, difficulties, and complications were distorted way out of proportions. Many workers allowed themselves to "become discouraged" with the unfamiliar products or gadgets too quickly, thus aborting truly conscientious attempts to make the "new-fangled notions" behave.

Of course, all these initial obstacles were overcome eventually, and the aforesaid products and processes are now quite common-

place. But prior to each victory a battle royal raged. If we could only realize how often our first reaction to change is purely emotional and completely illogical, future progress might travel a slightly smoother, slightly faster road.

Royal Jelly

COSMETIC manufacturers have had a field day promoting the royal jelly of the honey bee as a "fountain of youth" beauty aid for human females. In the past, effectiveness of the treatment has been variously evaluated by such non-standard units of measure as mood, prejudice, and the warmth of the compliments elicited.

But now scientists have found aspects which may have genuine therapeutic value. According to Blum, Novak, and Taylor (*Science*, August 21, 1959) the major component of the lipide fraction of royal jelly, 10-hydroxy- Δ^2 -decenoic acid, exhibits antibiotic activity against many bacteria and fungi.

The origin of this fatty acid in royal jelly is being investigated. In view of its remote relation to the more familiar ricinoleic acid, we might be well advised to keep in touch with future developments. Perhaps this will be the precursor of a line of Royal Varnishes.

Paleolithic Paint

IN a recent issue of *Science* (Sept. 18, 1959), Sheldon Judson, Department of Geology, Princeton University, pondered over the composition of the paint used by our stone age ancestors. In excavating a late paleolithic occupation site at Les Eyzies, France, hematite and kaolinite were discovered. Hematite as a pigment source is widely documented, but the presence of kaolinite imported into prehistoric sites posed problems. A suggestion was made that white clay might have been used as an extender pigment to mix with the earth colors.

Judson states, "As far as I know, the nature of the vehicle for paleolithic paint is still unknown. It is most generally held that pigments were mixed with animal fats. No analyses are available to test this or any other hypothesis. There is some ethnographic evidence, however, that Bushmen used animal fat as well as the latex-like sap

of some plants as a vehicle for pigment, and urine, milk, blood, and honey also have been suggested. Strangely enough, common water has not been suggested as a vehicle."

Micelles in Resins

A PAPER entitled "Occurrence of Globular Formations in Thermosetting Resins" by E. H. Erath and R. A. Spurr appeared recently in the *Journal of Polymer Science* XXXV, 391 (1959). It provides several clues to the solution of many coating problems.

The authors introduce their subject by reviewing the background and the problems. "In the light of theoretical considerations of resin structure it is puzzling that tensile strengths should have the small values found experimentally. Even if it is assumed that the cohesive forces are of the nature of van der Waals forces, calculated tensile strengths of phenol-formaldehyde resins are more than five times the experimental values. If it is assumed that molecular bonds must be broken in rupture, the discrepancy between theoretical and experimental values becomes even greater."

The authors continue with a discussion of two established hypotheses. First, "Houwink considers that, as a result of the presence of structural defects in resins, concentration of stresses arise which lead to successive ruptures at weak points. . . Houwink supposes. . . ? that the higher molecular weight material forms a sponge-like structure with cavities filled by lower molecular weight material."

Second, "Stager. . . picture(s) the resin as built up of colloidal particles embedded in material of lower molecular weight. Gelation occurs from entanglement of these particles and it is considered unnecessary to assume that they are then attached to one another by chemical bonds. . ."

"By either of the theories. . . it is necessary to assume the existence of aggregates in the resin structure which may be either sponge-like or corpuscular in form. It is convenient to designate these as 'micelles' without specifying whether they are attached to one another

by chemical bonds or surface forces."

The paper describes an electron-microscopic investigation which reveals the existence of micelles in phenolic and other resins. In the cured resin, these have the appearance of spheroids ranging in size from 400 A. to 900 A. in diameter. In uncured resin of low molecular weight, flattened globules of approximately the same volume are observed. The paper considers four resin types; phenolic, diallyl phthalate, epoxy, and silicone.

Although the resins investigated are not film forming materials, I suspect that they are sufficiently similar to film formers to justify comparisons with paint materials.

Electron-microscopic examination has disclosed that "micelles are abundant in phenolic, diallyl phthalate, and epoxy resins, and comparatively rare in silicones. The existence of micelles is in accordance with the theories of Houwink and Stager, who consider that polymerization proceeds most rapidly at specific points in the resin. . . At least in the case of phenolics, micelles appear to arise in filaments formed in the polymerization process."

The authors conclude their paper with this statement, "The discovery of the existence of micelles in thermosetting resins suggests a new field of investigation of the interrelationships among micelle sizes, conditions of resin preparation, and physical properties."

Coating the Teeth

THE search is on for a method of discouraging food from sticking to teeth. Dental scientists, realizing that cavities occur when bacteria act on food stuck to teeth, are seeking a protective coating that can prevent this eventuality.

Specifications are as follows: The coating must be easily applied, non-toxic, transparent, colorless, adherent to natural tooth enamel, resistant to wear, and resistant to the ravages of salivary action and bacterial enzymes. The leading contender at the moment is a high viscosity dimethyl polysiloxane with a cyanoacrylate monomer to aid adhesion, according to *Industrial Engineering Chemistry*, page 38A, September 1959 issue.

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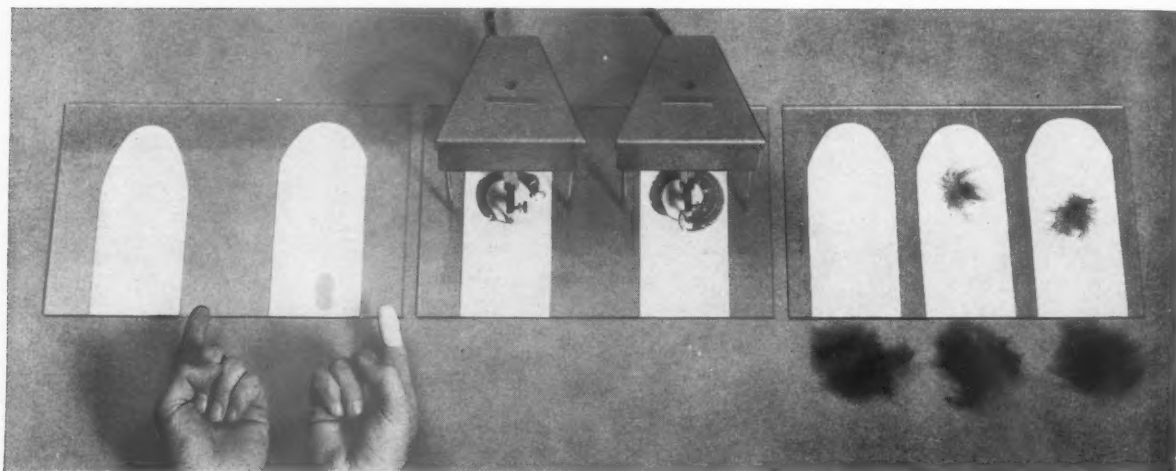
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WHAT DO YOU KNOW ABOUT DEPRECIATION?

Here are twenty pertinent questions and answers covering the various aspects of plant and equipment depreciation.

By
Irving Elbaum*

The word "depreciation" seems to have different meanings to different people in our field. Would you be good enough to give us the accounting approach?

The accountant and, for that matter, the income tax agent as well) understands depreciation to be a reasonable allowance for the wear and tear of property used in a business. In this way it differs from the ordinary concept of the term which is generally accepted to mean a decline in the market value. One other point—generally the factor of obsolescence is also included in any estimate for depreciation. This is understandable when one stops to consider that the probable useful life of a piece of equipment can be appreciably shortened by changes in economic conditions, loss of trade, new inventions, prohibitory laws, etc.

Since no cash outlay is involved in depreciation isn't it in effect just a bookkeeping entry?

True, it is a bookkeeping entry. However, it is an extremely important one. Even though no cash outlay is involved for any given year's depreciation it is vital to realize that unless the records of the business provide for depreciation for each of the years in the estimated life of the paste mixer, for example, the day will come when it will have to be replaced and there may not be enough cash left over from the profits of the business to buy a new one. It is therefore important to recognize that although this item of depreciation in a sense may be considered to be invisible in any one year it certainly isn't invisible when the cash has to be

laid out for the new mixer after the old one has served its purpose.

Could you go into a little more detail as to how the entry of depreciation helps to provide for the purchase of a new conveyor system?

Let us suppose that your business showed a profit of \$25,000 for the year 1959, without considering the item of depreciation. You might therefore consider that you increased your net worth by that amount of money, whereas actually you might have increased your net worth by only \$22,000, assuming that there really was \$3,000 of depreciation which you had neglected to record on your books. In other words, you would really be fooling yourself to the extent of that \$3,000 item and you would be rudely awakened when, after awhile, you had to buy a new conveyor to replace that which had already depreciated. If you hadn't held back enough cash from the profits of the years during which the original equipment was being depreciated you would find that you would be faced with a problem of obtaining sufficient cash when the new equipment would have to be bought. Naturally, this could be a great economic shock to your business.

How do I go about determining the expected life of a portable tank agitator?

There are a few ways in which this can be done. The manufacturer of the equipment can give you his estimate of the longevity of the agitator. The Internal Revenue Service by means of its Bulletin "F" indicates that the expected longevity of an agitator is approximately 15 years. Bulletin "F" is presently being

*CPA, Los Angeles, Calif.

revised, but the finished product will not be available for some time.

Am I necessarily obligated to use as the estimated longevity of a roller mill the figure that the manufacturer gives me or the figure that Internal Revenue suggests?

No. In the final analysis you are the one who will make the decision as to the number of years over which you feel it is fair and reasonable to write off the cost of the mill, less salvage value, of course. This is so because only you know the exact conditions under which the mill will be working.

You mention the expression "salvage value". Just what does that mean?

Salvage value means the amount you expect to recover from the sale of the machine at the end of its useful life. Of necessity this has to be a guess, but try to make it an educated guess rather than picking a figure out of the blue.

What are the basic methods of computing depreciation?

In the paint and varnish field the ways to compute depreciation are: the straight-line method, the sum-of-the-years-digits method, and the declining-balance method. Let me spend a little time on the general description of each of these. The straight-line method, which is a fairly popular one, is predicated on the assumption that wear and tear are uniform during the useful life of the equipment. Therefore, the cost of the item less its estimated salvage value is depreciated in equal amounts over the estimated useful life. Both the sum-of-the-years-digits method and the declining-balance method are predicated on the assumption that the depreciation is higher in the early years and lower in the later years of the life of a piece of equipment. The years-digits method works as follows: different fractions are used each year against the original cost, less salvage value. The numerator of the fraction represents the remaining useful life of the item each year and the denominator, which always remains the same, represents the sum of the digits of all the years corresponding to the estimated longevity. For example, if the piece of equipment has an estimated life of four years the denominator of the fraction would always be 10, since 4 and 3 and 2 and 1 equal 10. For the first year 4/10 of the cost (less salvage value) would be depreciated, 3/10 in the second year, etc. Under the declining-balance method of depreciation the depreciation base is lowered each year by the amount of the depreciation deduction and a steady rate is applied to the balances that result. Under federal income tax provisions this declining-balance rate may be as high as 200% of the straight-line rate.

Could you perhaps show a numerical comparison of these methods?

Surely. The tabulation below shows for each of the three methods the annual depreciation charge as well as the accumulated depreciation up to the end of any given year. The basic facts used in the preparation of this table are as follows: it was assumed that a group of equipment cost \$10,000 and had a negligible salvage value. It was estimated that the useful life of the items would be four years. (See Table I).

You will note that under the straight-line and sum-of-the-digits methods the accumulated depreciation is \$10,000 at the end of the fourth year, whereas under the 200% declining-balance method the accumulated amount is only \$9,375. The balance of \$625 can be handled in one of two ways. Since the income tax law allows a taxpayer to switch from the declining-balance method to the straight-line method at any time without the consent of the Commissioner of Internal Revenue it would be a wise idea for the taxpayer in this situation to switch from this declining-balance method to the straight-line method after the end of the third year. Another alternative would be to depreciate the group in the amount of \$1,250.00 in the fourth year of the group's life if the assets were abandoned by the end of that year.

In addition to serving as documentation in the event of an income tax audit what other useful purposes are served by depreciation records?

Records of depreciation are invaluable in cases of loss, where you are trying to prove to the insurance company what the values of the damaged items were. In addition, personal property tax and sales tax audits are greatly facilitated by bringing into play accurate and up-to-the-minute depreciation records. When either the entire business is to be sold or when a given piece of equipment is to be sold it is sometimes vital that the prospective purchaser know what the cost, the annual depreciation, the accumulated depreciation, and the salvage value factors are.

We have two fork trucks. Must we use the same depreciation method for both, assuming that they are both new in use with us and that they have an estimated useful life of 3 years or more?

Not at all. You may depreciate one under one depreciation method and you may depreciate the other under an entirely different one.

Suppose I had a bad year in my business in 1959 and did not choose to deduct depreciation. Would I therefore be allowed to deduct twice the amount I normally could in the year 1960?

No. The law is so worded that the deduction for

Year	Straight-line		Sum-of-digits		200% declining-balance	
	Annually	Accumulated	Annually	Accumulated	Annually	Accumulated
1	2,500	2,500	4,000	4,000	5,000	5,000
2	2,500	5,000	3,000	7,000	2,500	7,500
3	2,500	7,500	2,000	9,000	1,250	8,750
4	2,500	10,000	1,000	10,000	625	9,375

Table I. Three methods for calculation annual depreciation charges.

depreciation is limited to the amount that was allowed or allowable. Since depreciation for 1959 in your case was allowable, even though you chose not to take that deduction, you would never be able to recover the depreciation for that year.

Is there anything I can do to guarantee that the depreciation rate I picked for my pressure filler will not be upset by the Internal Revenue Service at a later date?

Yes. According to the law you can make an agreement with the Commissioner of Internal Revenue establishing the depreciation rate which will apply to either a given piece of equipment or to a group of machines. This works very advantageously in that it helps to avoid future friction between the taxpayer and the Internal Revenue Service.

A competitor told me recently that he figures depreciation on his vacuum dryer exactly to the day. Must I, for managerial purposes and/or income tax purposes, do the same thing?

No. If you'd like you can do as follows: any equipment bought during the first half of the month can be considered to have been bought as of the first of that month, any equipment bought during the last half of a month can be considered to have been bought as of the first of the next month. Some firms feel a simple way to handle additions and subtractions of equipment that occurred during the year is to assume that they took place as of the mid-point of the taxpayer's year, namely July 1st in the case of a calendar year taxpayer.

Where on my profit and loss statement must I show the expense for depreciation?

There is no one place where the item of depreciation must be shown on a profit and loss statement. For example, some firms in your field like to show depreciation as part of the regular operating expenses. Others like to show it as a separate item after the normal operating profit. The important thing to remember is that depreciation must, at all costs, be shown somewhere in the profit and loss statement since it is one of the vital cost factors.

Every so often I like to figure my breakeven point. Naturally, in order for me to be able to do that I must know what my overhead is. Is it really important for me to include depreciation as an item of overhead?

Absolutely. Although depreciation is in a sense invisible it is also insidious. As each page on the calendar is destroyed the depreciation on a piece of equipment becomes greater. If you allow yourself to be deluded by the fact that it is not important to include depreciation as an item of overhead because no cash outlay is involved you will be fooling yourself to the extent that you will be understating your total overhead. Furthermore, although an immediate cash outlay is not involved with depreciation, obviously money will have to be paid out in the future. Depreciation merely acts as a convenient method for reducing the profit per the books to such a level that when the day comes (as it ultimately must) that a new piece of equipment has to be purchased there will be enough funds in the business to be able to do so.

I've been hearing quite a bit about some new income tax benefits in connection with the depreciation deduction. Would you review the salient points?

Surely. The new tax law gives a business the option of using a one-shot benefit which amounts to a flat 20% of the cost of the item. The item must be personal property (thus excluding buildings) which is used in a business or for income-producing purposes. The equipment must have an estimated useful life of 6 or more years and have been acquired after December 31, 1959. The items can be new or used. The flat 20% is figured on the cost, no provision having to be made for the estimated salvage value. The maximum amount allowable is \$10,000 (or \$20,000 for married taxpayers filing a joint return) in any one year.

Does this new depreciation replace the speedy methods (declining-balance, sum-of-digits) we used on last year's tax return?

No. The new flat 20% is in addition to any regular or speedy method. However, it is important to recognize that the speedy methods you have been using cover new property that has an estimated longevity of 3 or more years and that is either personal or real property. Notice how much more limiting the new provisions are.

Suppose I want to use the 20% provision on a spectrophotometer which I bought July 1, 1959. Must I prorate the 20%, since I only had the spectrophotometer for 6 months in 1959?

No. This 20% deduction is allowed even if you had the item for only 1 day during the year. As a matter of fact the 20% can even be deducted if it were sold during the year.

My business is run through two corporations. Am I entitled to a maximum of \$10,000 or \$20,000 as the 20% deduction in each corporation, since I file a joint return with my wife each year?

Since a corporation cannot file a joint return the limitation is \$10,000. Of course, each corporation is entitled to its \$10,000 potential maximum.

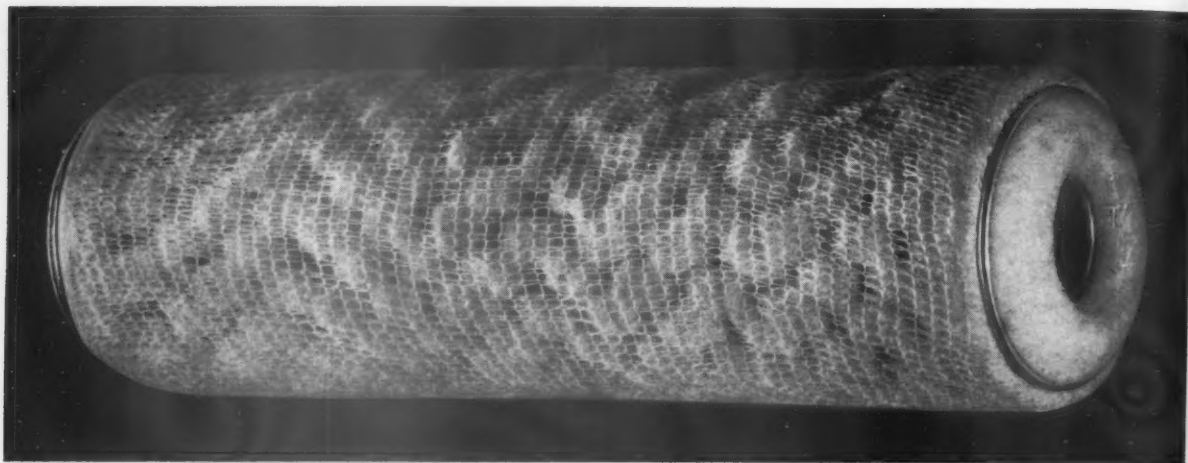
I think it would be wise if I could see an actual illustration of these new pointers. Please show me.

Suppose the firm bought some equipment on July 1, 1959 with an expected life of 8 years and costing \$4,000. If the straight-line method is used (assuming the equipment was used) the firm would be entitled to \$1,000 as its first year's depreciation deduction. This is calculated as follows:

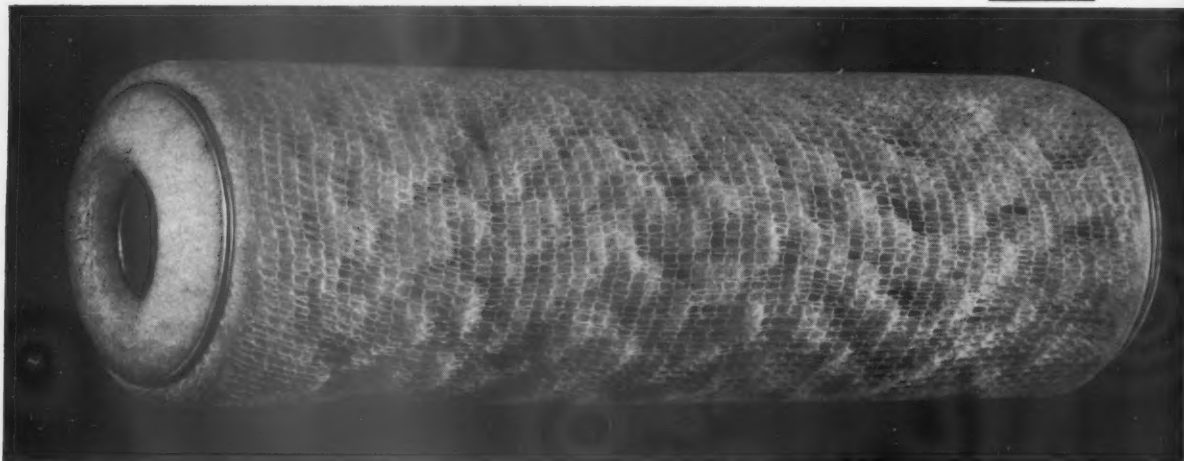
Flat 20% of \$4,000	\$800
\$3,200 (\$4,000 less the \$800) multiplied by 1/8 (since there is an estimated life of 8 years) multiplied by 1/2 (since the items were bought on July 1st)	200
Total	\$1,000

If the declining-balance method is used (assuming the equipment was new) the firm would be entitled to \$1,200 as its first year's depreciation deduction. This is calculated as follows:

Flat 20% of \$4,000	\$ 800
\$3,200 (\$4,000 less the \$800) multiplied by 1/8 multiplied by 1/2 multiplied by 2 (since this is the 200% declining-balance method)	400
Total	\$1,200



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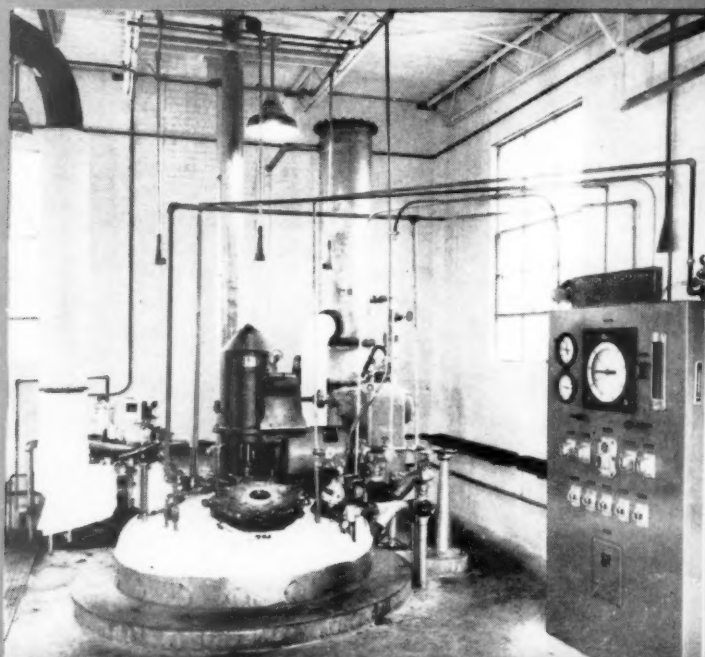
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The Foy Paint Co. of Cincinnati uses this modern gas-fired unit to cook varnishes and alkyds. For details of this process, see page 53.

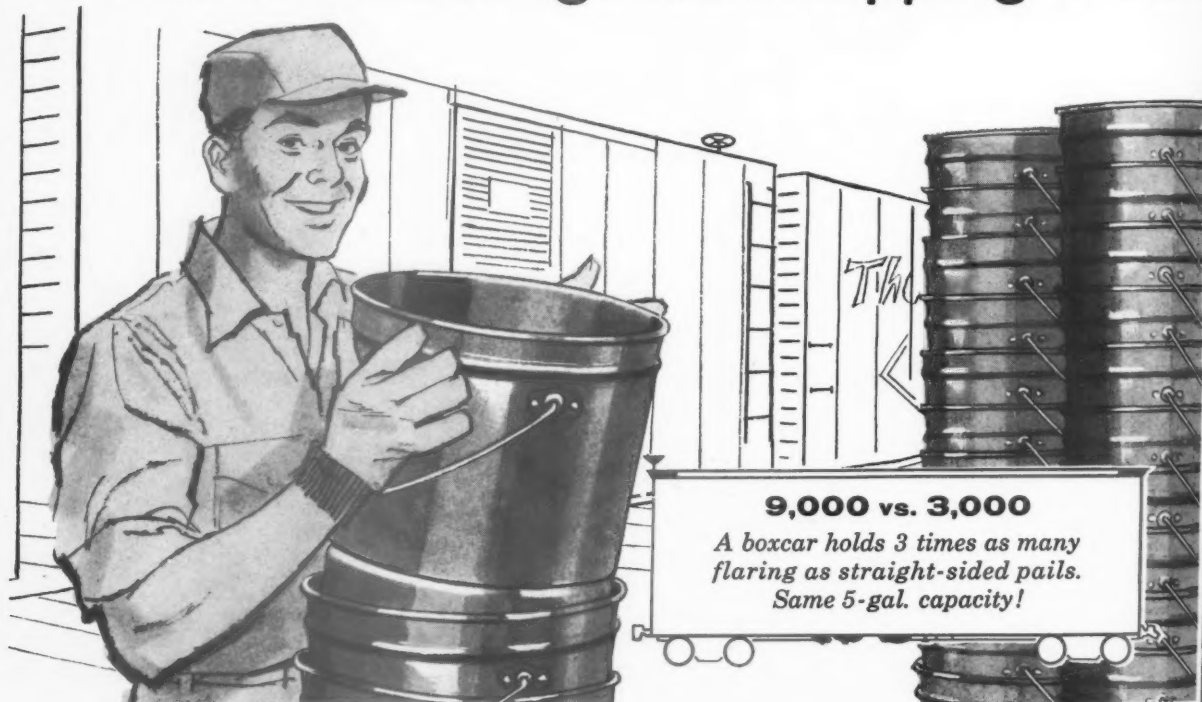


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THE ROLE OF THE FOREMAN

By
Lawrence Shatkin

THE successful foreman must learn to read deep meaning into the statement, "as a man thinketh in his heart, so is he."

The foreman is in a pivotal position to carry out the program of management. His actions will determine the impressions that the worker has of the company. Yet we find the foreman operating in a vacuum — a so-called no man's land. This is so because his responsibilities and authority have not been clearly defined.

A generation ago the foreman was merely judged on his skill for getting things done. Today, his task is more complex. Although he still has to get things accomplished, his program and actions must be executed judiciously and in accord with broad management-labor policies. He must keep his workers informed, mold their attitudes, and apply their proficiency to specific goals and objectives.

In many instances the choice of a foreman was determined by a few characteristics: (1) Was he a top producer? (2) Did he reflect

management's thinking? (3) Did he get along well with everyone? These distinctive qualities by themselves would not necessarily bring about effective foremen. Further probing is required.

What Makes A "Good" Foreman?

A good foreman should have the ability to establish good human relations with people. In many in-

stances he should be able to perform the jobs of the men he supervises, and at the same time exercise empathy.

The foreman must endeavor to relieve some of the pressures on his men by showing an understanding of the attitudes of his men. He should help his men and back up whenever necessary, and try to see



the worker's side of every situation. He should act in the capacity of a leader and usually request his men to perform a job, rather than tell them to do it. Tremendous importance is attached to the tone of voice and the manner of speaking employed by the foreman. A worker is usually willing to work harder and more effectively for the foreman who is willing to listen to him and ask his advice.

Criteria For Selection

A foreman has very little idle time. He has to handle many pressing problems in rapid-fire order with constant interruptions, and must juggle priorities for action.



Often times the foreman must make various quality control tests before approving the shipment of the product to a customer.

In setting up criteria for the selection of foreman, management must give as much consideration to a man's psychological ability to face up to these conditions as it does to other qualifications, such as technical know-how and human relations. Management must take some of the pressures off the foreman, giving him opportunity to think and to feel, time to listen and observe, room to grow, freedom to experiment, permission to make mistakes and to learn by them, and a chance to develop a sense of proportion and a sense of humor.

The best selection and training techniques can hardly be expected to pay off, if the conditions of the job make it impossible for a foreman to discharge at all times the full scope of his responsibilities.

A reduction in these interruptions and potential points of conflict are necessary so that the foreman can concentrate on improving human relations. The high-producing supervisor places primary emphasis on the human problems of his workers. He not only trains them to do their present job well, but also to do the next higher job. He is interested in helping with their problems, on the job and off.

The Foreman and Productivity

To the average worker the foreman is the company, and the treatment he receives will affect his productivity. The successful leader directs his energies purposefully, by establishing direction for



his subordinates, and giving them the freedom to attain these objectives in ways based on their experience. The more pressure employees feel, the less they tend to produce. High productivity, high motivation, and high worker satisfaction go together.

Factors Which Alienate Foremen

Foremen who are not kept abreast of new or modified company policies will have to depend upon the "grapevine" for information. It is indeed embarrassing to a foreman when he is questioned on a company matter he knows nothing about. These incidents take the play away from the foreman and reduce his prestige.

A supervisor that isn't given the authority commensurate with his

responsibility becomes frustrated, irritated, and non-productive. This is further aggravated when he isn't given any voice in policy making on matters that affect his working area. After all, he knows his men better than anyone else, and can anticipate certain reactions from contemplated changes.

The above circumstances decrease his status and cause a lack of security. It prevents a foreman from learning to manage by managing.

Dealing With Workers

During the course of a working day the foreman is apt to encounter problems with his men. He should avoid the following behavior:

- (1) Reprimanding a man in front of others;
- (2) Employing threats;
- (3) Being sarcastic;
- (4) Failing to take action;
- (5) Being inconsistent;
- (6) Not pursuing all the facts;
- (7) Correcting in an indirect manner.

Management Views the Foreman

The foreman should be evaluated on his over-all performance, assessing his strengths and weaknesses for further expansion. The four major classifications valued by management include technological, personal, administrative, and employee reactions. The underlying theme in all these categories concern relationships between people in one way or another.

Personal talks with individuals throughout a company presents an excellent opportunity for a manager to foster closer contact with his workers, and at the same time disseminate salient company information. A production activities analysis can be a starting point.

Every action of management has two aspects, one the intended meaning, the other latent. The latter is the meaning imputed to the action. It is symbolic in nature.

There is no easy way to improve employee relations. It is tied up with economic, moral, and ethical values. Management's treatment of the foreman influences his behavior toward his men.

Many research studies have indicated that the most successful foremen were those who delegated responsibility as widely as possible.

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DIRECT FIRE SYSTEM FOR HEAT TRANSFER

Foy Paint Company uses modern gas-fired unit of 1,000-gallon capacity for processing varnishes and alkyds.

THE direct fire method for cooking varnishes and synthetic resins is, perhaps, the most common heat transfer system known. There are three common direct fired systems: the coke fired system with coke pit; the gas fired system; and the oil fired system.

The coke fired system is the simplest and the oldest method used, but requires considerable care to give best results. Oil fired systems have been found to be satisfactory and often a combination oil or gas system is used so that in the event of failure of supply of one fuel it can be replaced by the other without interruption.

The most extensive system used in varnish and synthetic resin operations is the gas-fired system for there are a number of methods

mixing the gas and air in proper proportion as well as supplying the gas to the kettle.

These methods fall into the following classes:

The low pressure gas system ranging approximately from 3 to 6 ounces of water pressure.

The high pressure gas system where the pressure may range from $1\frac{1}{2}$ to 5 pounds approximately.

The pre-mixed type of gas system where either hand control or automatic control of proportioning may be used.

The inspirator type of gas system where gas at approximately 2 pounds pressure draws in the proper amount of air for combustion.

The aspirator type of gas system where air at an approximate min-

imum of 3 ounces of water pressure is used to draw in the proper amount of gas.

The manual mix control system is the cheapest in cost. Automatic temperature control may be applied to any of the foregoing systems.

There is available a large variety of nozzles and burners used in the gas fired system. Typical types are shown in Figure 1.

In recent years the gas fired system has undergone many innovations and refinements in operation so that this method of heat transfer is now widely accepted in the processing of oils, varnishes, resins, etc.

A typical modern gas fired unit is now being operated by the Foy Paint Co. of Cincinnati, Ohio. This

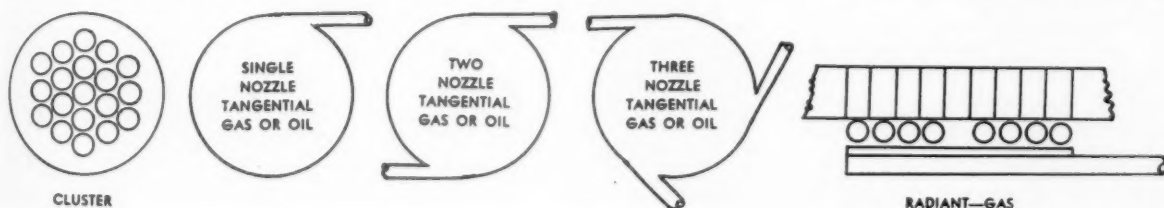


Figure 1. Types of burners used in gas firing systems.

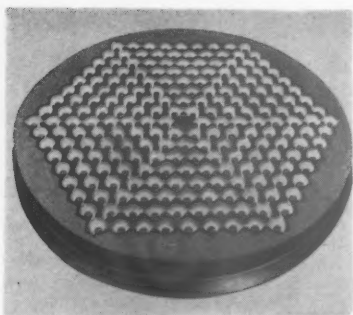


Figure 2. Cluster arrangement of Dur-radiant burners (Selas Corp.).

direct fired set kettle has a capacity of 1000 gallons and is used to body oils, process alkyds and other types of resins.

The heating plant is a radiant heat gas furnace in which the reactor sets. The burner setting consists of a group of individual burners in ceramic cup shaped hexagonal blocks (Figure 2) nested together in such a manner that, when heated, produces an incandescent mass which radiates heat to the bottom of the kettle. The burner blocks are heated by short multijet flames which burn inside the cup area, cleanly, and with high efficiency. There is no flame impingement on the reactor bottom so it does not become coated and there are no hot spots.

An efficient agitator inside the reactor scours the bottom thoroughly so that any tendency to scorch or darken the product is eliminated. Heat-up rates are comparable to Dowtherm heated reactors. Resins having a Gardner color rating between 1 and 2 are normally produced (using good quality raw materials). Furnace design also permits the use of a flush type drain valve on the bottom of the reactor. Valve extends through a sealed opening in the bottom of the furnace. An efficient cooling system in a jacket outside of the reactor shell gives cooling rates as high as 10°F per minute.

The loading of the kettle is quite simple. Liquid materials are pumped through pipe connections and dry powders through the manway. (See Figure 3.) The main requirement is that the charging area be completely shut off or shielded from the fire room.

The furnace is located in a room below the reactor operating floor as shown in Figure 4. This room has

no connecting openings to the reactor operating room and is accessible only through an outside door. The opening in the operating floor around the reactor where it projects into the operating room is closed tightly by means of a sand seal arrangement. This prevents any change of flammable solvents, used in the azeotropic method of resin making, from entering the furnace and thereby eliminates the explosion and fire hazard that would otherwise be present.

Electronic safety devices remove hazard from gas explosion by automatically closing the main gas valve in the event of pilot flame failure. Furnace is automatically purged with air upon startup, prior to pilot flame ignition. Flame is then ignited by an electric spark initiated from a push button on the control board in the reactor operating room.

The control board is entirely explosion-proof, except for the control instruments. These are kept under positive carbon dioxide pressure in order to exclude the possibility of any solvent vapors entering the instruments.

The kettle is equipped with very fine controls and as the proper temperature is reached, the burner zones begin to cut off with the ex-

ception of the pilot. If there is a one degree rise in temperature above the desired control point, cooling water is automatically turned on and as the temperature starts to fall, the various fire zones reignite to hold the desired control point. One feature of this unit is that automatic controls (Figure 5) modulate the furnace burners to give pinpoint temperature regulation.

During the alcoholysis process the entire batch is kept under a blanket of CO₂ and after the addition of phthalic anhydride and catalysts the kettle is closed and the solvent process is immediately put into operation. This means that a certain percent of xylene is added to the mix and refluxing is commenced after returning to the control point.

When the batch is finished the reflux is drawn off and the kettle is blown out under CO₂ pressure into the weigh and thin tank. There solvents are added to reduce the resin to the desired percent of solvent. They are then centrifuged and pumped to the storage tanks.

With proper operation and good quality raw materials, Foy finds the direct fire method very satisfactory in producing uniform products of good color. Also kettle and furnace of this particular unit insures a minimum of fire hazard.

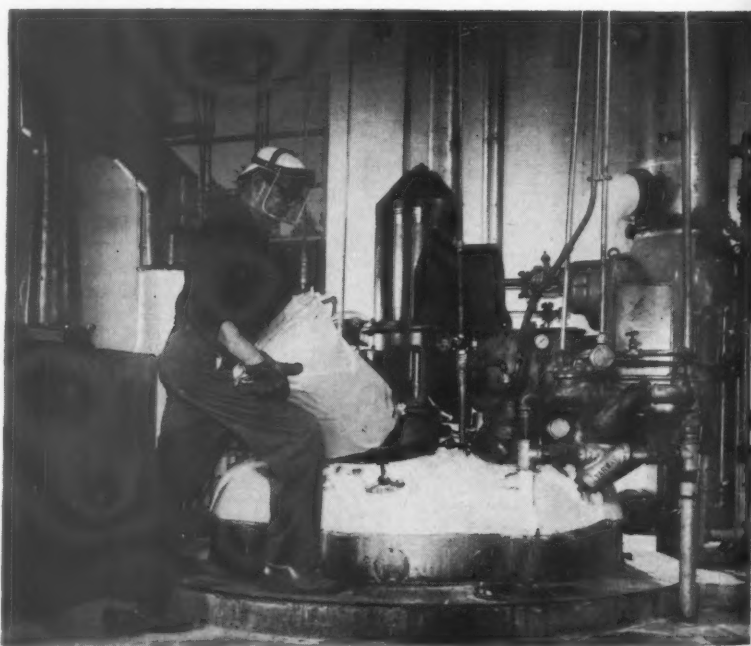


Figure 3. Charging kettle.

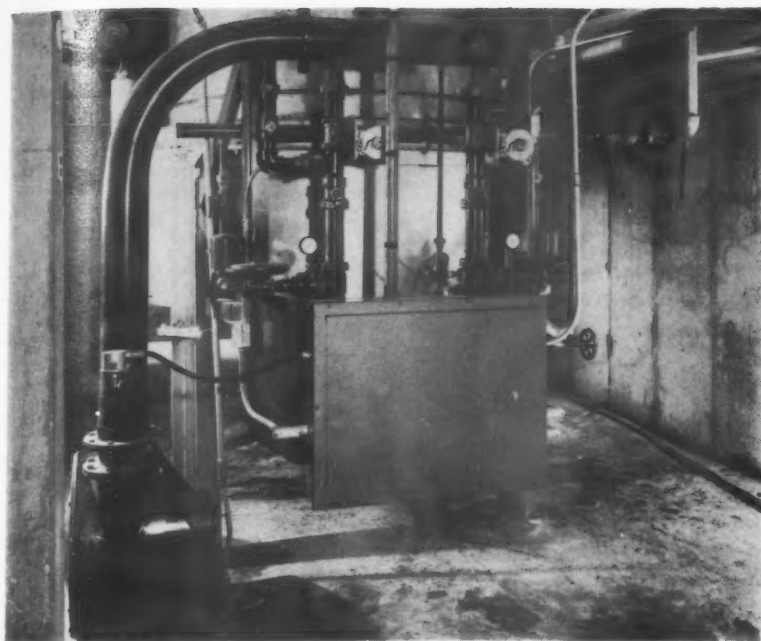


Figure 4. Furnace room located below reactor.

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ARLCITE'S high density and tough bond strike the optimum balance between weight and wear resistance for lowest cost grinding. Fastest grinding is assured without sacrificing rugged wearing qualities. Research and plant production records prove conclusively that only Patterson Arcite provides this RIGHT combination for the most efficient and economical grinding performance.

The exclusive tongue and groove feature in Arcite blocks insures an interlocked, tightly keyed lining with narrowest cement joints. For full information on Arcite Balls and Blocks and their outstanding service advantages, write for our latest Bulletin.

PORCELAIN DIVISION

FERRO CORPORATION
East Liverpool, Ohio



Figure 5. Checking instrument panel. Automatic controls provide pinpoint regulation.

New Developments

Paint Resistance Tester And Technique Developed

Ransburg Electro-Coating Corp. announces the development of a new technique for improving the sprayability of coating materials for electrostatic application by Ransburg's No. 2 Process. They are also making available a new test instrument that will prove useful to both paint manufacturers and users of No. 2 electrostatic spray, with either Ransburg's automatic or hand gun equipment.

The electric resistance of paint has a marked influence on how the paint performs in airless electrostatic spray equipment. Until now, this fact has been of little value. It remained for Ransburg research to develop a standard method of measurement and to establish desired resistance values. This new knowledge makes possible decided improvements in sprayability.

The new method amounts to

measuring the paint's resistance to electric current flow, then adjusting it to Ransburg's established range by selection of proper solvents. Simplicity of this technique makes it of special importance to the paint user. It can be used in his paint mix room without the need of a trained laboratory technician.

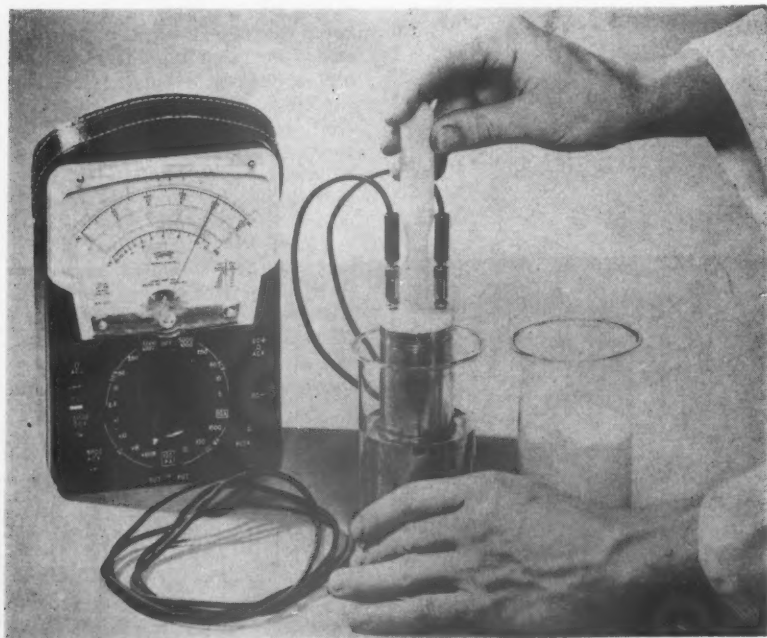
Heretofore, selection of solvent has been based on a number of factors: compatibility with the binder, resin, and pigment, the desired viscosity, evaporation rate, film appearance, cost, etc. Now the solvent's influence on the electrical resistance of the paint mixture should also be considered.

Actually, this influence can be amazing. Ransburg has shown that a particular paint which atomizes very poorly can be made to perform ideally by a slight solvent adjustment. In fact, this new technique makes it possible to apply paints with airless electrostatic that could not otherwise be sprayed satisfactorily with the No. 2 Process.

Ransburg is recommending the following resistance range for best performance of coating materials: 50,000—1,000,000 ohms for No. 2 Process automatic equipment; and 100,000—1,000,000 ohms for the No. 2 Process hand spray gun. These values are based upon Ransburg's new test instrument—Paint Resistance Tester. Along with the tester, Ransburg is making available a Triplet Model #630PL Ohmmeter.

Steel Flake as Pigment

Stainless steel supplied as a pigment in flake form for use in the manufacture of stainless steel paints is now available. Known as Stainless Steel Flake Type 302, it is composed of 18 per cent Cr and 8 percent Ni. It is a fine pigment—98.75 percent minus 150 mesh—with a specific gravity of 7.55 and a weight per gallon of 62.9 lbs. Recommended for use in new metal protective paints with outstanding durability and long life on exterior exposure in corrosive atmospheres, this stainless steel pigment, is manufactured by Micronized Metals, Inc., 38-13 10th St., Long Island City, 1, N. Y.



Electrical resistance of paint mixture is measured by Ransburg's new tester to determine if it is in proper range for best performance in airless electrostatic spray. Tests can be made at any viscosity and in any size or kind of container.



EPOXY RESINS



TIGHT QUALITY CONTROLS keep Dow Epoxy Resins unmatched for uniformity

As a basic producer of fine epoxy raw materials, Dow can maintain tight quality controls *throughout the production process*. These exact and extensive controls from start to finish result in many benefits, including these three: A narrower range of specifications means you, the paint manufacturer, get a clear, gel-free resin *every time*. Then there's the low salt content and lack of impurities that contribute to over-all film integrity for the most exacting applications. Third, is the exceptional uniformity for which Dow Epoxy

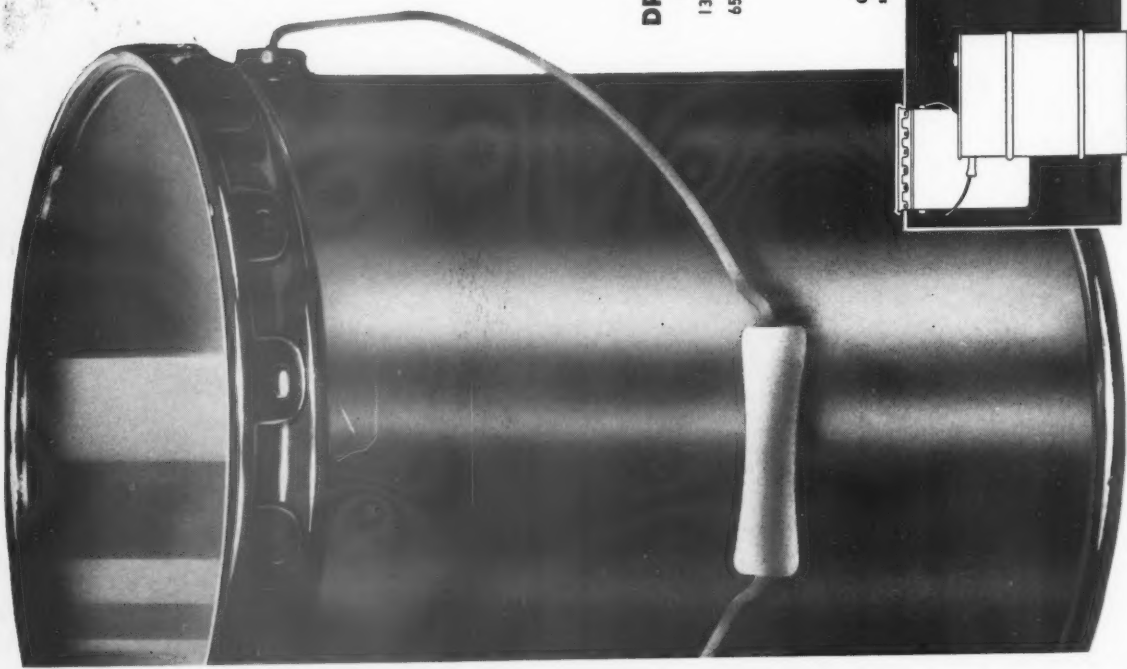
Resins are well known among paint manufacturers. These premium-grade, almost colorless resins (with no increase in price) are free-flowing and easy to handle with complete cold-cut solubility.

Why not let the new Dow Epoxy Resins make an extra profit for you? Get informative technical data on both Dow Solid and Dow Liquid Epoxy Resins from your local Dow sales office. Or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Department 2365DL11.

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LATEX



**Wider range of quality paint formulations cost less
with Dow Styrene Butadiene Latex**

Formulators save right from the start with Dow Styrene Butadiene Latex because it costs less per gallon of paint than so-called "comparable" latexes. Equally important, it also saves on formulating costs since it is readily compatible with a wider range of modifiers and can be used as the base of an entire diversified line of paints.

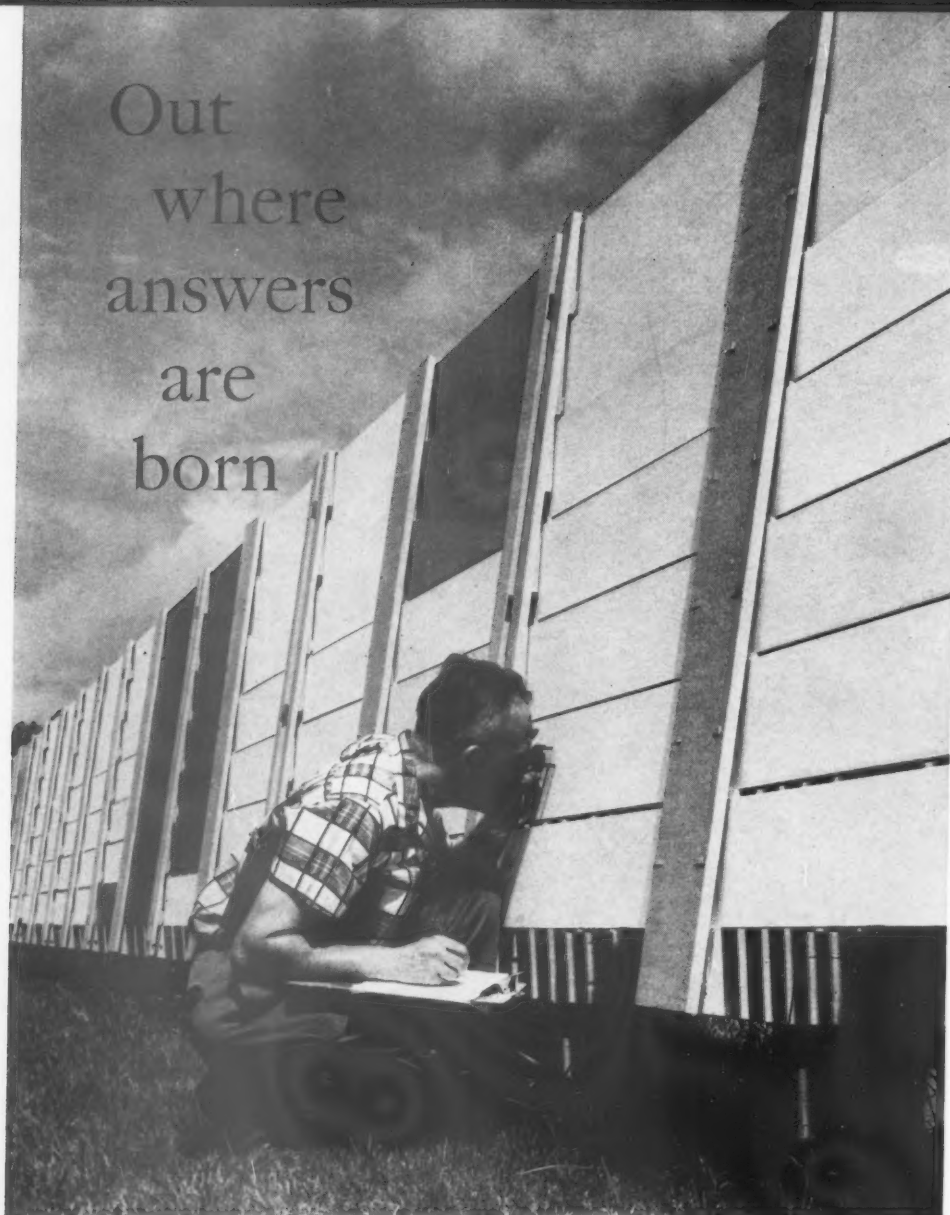
Paints for concrete floors, exterior masonry, interior walls, roofs, metal finishing, lawns—for application by brush, roller or spray gun—are among those in which Dow Styrene Butadiene Latex is being widely used today. And its time and money-saving versatility means that paint manufacturers

need make no compromise to achieve the highest quality. You get many other extra benefits when you use Dow Latex. Complete batch uniformity, for example. And superior pigment binding due to its higher critical PVC. Better adhesion to gloss surfaces. Resistance to water spotting. Ready acceptance of even the most difficult organic colors.

Get the full facts on how Dow Styrene Butadiene Latex can improve and enlarge any paint line—can actually provide better quality for less money. Call the nearest Dow sales office. Or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Department 2311DL11.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

Out
where
answers
are
born



The question's always the same: how to make it better. Our research is restless, and the best thing anybody can say about us is that we're never satisfied. This test fence is a good example. We've been testing various formulations with our variety of calcium carbonates for some years now, and the combinations are almost infinite. But we keep at it, and the results of this diligence are sometimes surprising. We've turned up many ways to save our customers considerable sums in formulation costs, yet still contribute to durability and color retention. We'll do even better tomorrow. In the meantime, we can probably serve you well. Why not write us and see. It would be a pleasure to hear from you.

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- ☐ Monsanto representative contact me
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SANTOCEL FR-C:
The most efficient
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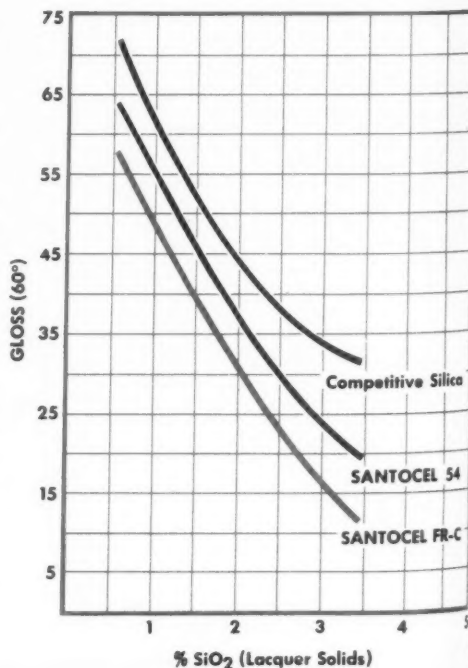
For everything YOU need to start saving, fill in and mail this card

Here's proof of savings:

Compared to its SANTOCEL predecessors, you can use 10-20% less SANTOCEL FR-C—cut costs by an equal amount—and attain the same degree of flatting, from a matte finish to a semigloss.

If you are not using any SANTOCEL flatting agent now, you should *save even more* by replacing your present flatting agent with SANTOCEL FR-C, Monsanto's improved silica aerogel! It flats without clouding, gives clear hard films. Try SANTOCEL FR-C soon.

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8-HOUR GRIND NITROCELLULOSE LACQUER



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THE AEROSOL CORNER

In recent years the field of aerosol paints has shown spectacular growth. Last year some 70 million cans of aerosol paints were produced with a volume of 100 million cans forecast for 1959.

Aerosol paints have come a long way since they were first introduced ten years ago. Today a wide range of paints can be packaged in the aerosol can. Among these are lacquers and enamels, wrinkle and hammer-tone finishes, and more recently multi-color lacquers. The purpose of this new monthly feature is to keep you abreast of the many technical developments and trends taking place in this burgeoning field of aerosol paints.

In subsequent issues we are scheduling comprehensive features on aerosol containers, propellants, valves, product formulation, storage and service life of aerosol paints, and cost studies.

Your comments and opinions on this new monthly feature are welcomed.

American Can Company has forecast that trade paint sales will begin to increase sharply in 1961 and that the years following should mean greater prosperity for the paint industry.

This optimistic outlook, which sees 367 million gallons of trade paint consumed in 1961 (11.3 per cent higher than 1956), does not include those that are marketed in aerosols, yet aerosol paints are the fastest-growing item in the paint industry, according to C. S. Stephens, Product Manager, Non-Foods Container, American Can Company.

As a major supplier to the paint industry, we believe pushbutton paints have one of the largest growth potentials of any non-food aerosol product on the market. The indications are that by 1964 about 110 million cans will be sold annually.

We estimated aerosol paint sales now at the annual rate of 60 million units, 20 per cent over the 50 million of 1958. Sales in 1957 amounted to 35 million cans.

Sales have been rising steadily, and setting records every year. There are a number of reasons for believing this growth will continue at an accelerated pace.

We feel, for example, that the

public now is satisfied with the product and that technical problems involving the paint and package have been solved. In short, as people buy these products, they'll find they are easy to use, find more uses for them, and consequently buy more of them.

Paint manufacturers have perfected improved formulations of their products, specifically for use in pressure cans, while suppliers have developed high-quality containers and clog-proof valves. Improvements such as these have turned

aerosol paints from a moderate seller into a hot item.

More than 100 brands of aerosol paints now are on the market. As volume grows so should the number of brands and types of products put out under these brands. Recent examples of this are a line of reflective coatings just added by one leading manufacturer, marine finishes and similar items.

Our growing national population and the current "do-it-yourself" trend are other factors that are certain to contribute to the future growth of markets for pressure paints.

AS Americans enjoy more and more leisure time, the do-it-yourself idea has become more than a random thing around the home. This fact has been a strong influence in the rocketing sales of aerosol paints, according to Herbert D. Fine, President of Plasti-Kote, Inc. of Cleveland.

Industry surveys show that aerosol paint sales have increased about 50% a year for the past several years. From 70,000,000 cans in 1958, production is expected to reach 100,000,000 this year. Mr. Fine foresees a 250,000,000 can market by 1965, after which growth will probably be slower, but steady. He states that by 1961 paint will be the number one selling aerosol product, except for food.

The Plasti-Kote president notes that the industry does not seem to suffer during periods of economic decline. During the 1958 recession and this year's steel strike, the



C. S. Stephens



H. D. Fine

aerosol paint business boomed in areas affected by these situations. Many unemployed workers were using their enforced idle time for repairs and remodeling around the home.

Mr. Fine observes that the spray can is not intended to replace the conventional five-gallon paint can. In 1958 aerosol paint sales represented 2.5% of the total retail market in paints. But he believes that aerosol paints will replace at least 90% of all can paints in quart, pint and half-pint sizes.

There is still a great need of educating the public in the existence of aerosol paints, says Mr. Fine. A recent Plasti-Kote survey showed that only 40% of the public is aware of the availability of paint in aerosol pressurized cans, and only half of these have actually used them. Of those who have tried aerosol paints, the new method is preferred by three to one. The potential market for aerosols is great, and manufacturers will prosper when consumers are fully aware that they can purchase aerosol paints in their neighborhood.

In 1954 Plasti-Kote junked its conventional paint can business to concentrate on aerosol containers. This move followed five years of development work which began not long after the appearance of the low pressure insecticide bomb. The company saw that aerosol paint cans could do small jobs and touch-up work at a saving in time and cost. Daily capacity of 6,000 cans five years ago has jumped to 76,000, with anticipated sales this year of more than 10,000,000 units.

The company now produces 2400 different colors and products, including 350 colors to match major car paints from the years 1957 to 1959. The success of the latter line is based on the need for a spray touch-up for automobiles. Also, aerosol paints are the answer to decorating items such as lamps, picture frames, shoes, handbags, small tables and ornaments. Women find aerosol paints easy to apply, and they appreciate not having to clean paint brushes.

Aerosol hammer finish in a variety of colors are now available and these find ready use in the automotive field for repainting auto dashboards, and in the hardware and industrial field for repainting

tool boxes, motors and machines. Old desks, tables, chairs and dressers can now easily be refinished in maple, walnut and mahogany by means of aerosol application.

A product that is new and different from any that now appears on the market is a multi-color finish. Initial development of the product is progressing, and its sprayability is reported good. Plasti-Kote is about to market such a product and is now conducting shelf life tests to make certain that multi-color finish will not deteriorate in the can.

Special colors for industrial firms to match colors to standard equipment that may become damaged in transit or upon installation have found their way into the aerosol package. Most major manufacturers today supply aerosol paint cans with machinery, office furniture, storm windows, etc., thus eliminating an old source of customer dissatisfaction.

Mr. Fine believes that the increasing appearance of aerosol paint cans in drug stores and super markets is a boon to the industry. Every home owner and housewife enters these outlets several times a week. Aerosol paints lend themselves to mass distribution in volume stores, because they are usually sold in one size and are easily displayed and marked for impulse selling.

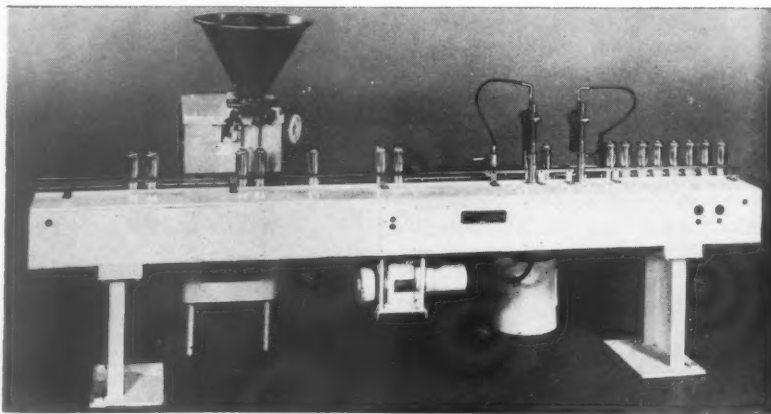
The aerosol paint industry has come of age, says Mr. Fine. He predicts that the next few years may lack the remarkable developments of the past, but sees a steady expansion, with improvements in containers and valves, and new and more useful paints.

New Aerosol Equipment To be Shown by Colton At Packaging Show

A new aerosol filling line of straight-line design for medium-volume automatic production, an automatic machine for filling and heat-sealing polyethylene tubes and a rotary unscrambler are among the new equipment to be featured by Arthur Colton Co., Detroit, Mich. at the forthcoming Packaging Machinery Manufacturers Institute Show to be held in the New York Coliseum from November 17-20, 1959

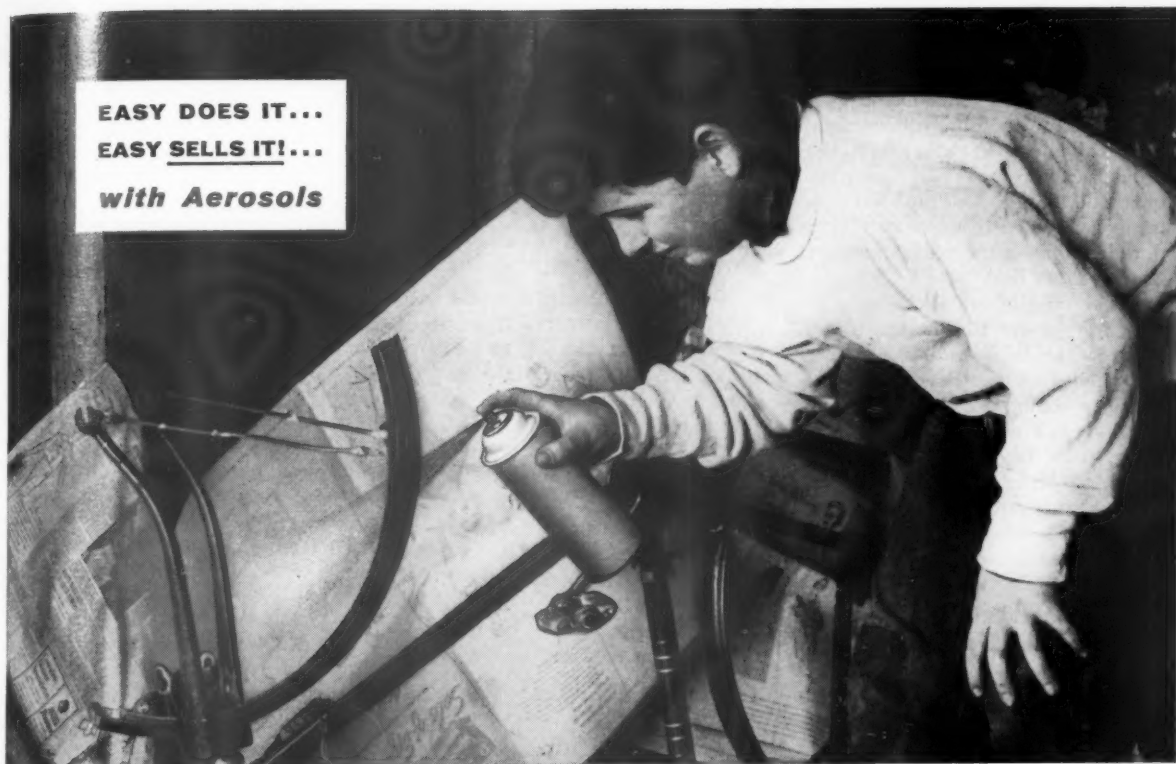
The new Colton-Alpha aerosol filling production line will handle up to 30 containers per minute on a single straight line. A twin line with similar equipment will pressure-fill up to 60 containers per minute. Included in the line, is a variable speed drive; a double-ported, two-nozzle Model 15MS Colton-Hope filler; a single head crimper and a single-head pressure-filler that enables the container pressurizing operation to be carried out without refrigeration. The line will fill containers with liquids and light viscous materials. The straight-line automatic production unit is designed to permit low-cost changeover.

The Colton Model 175 filling machine in the exhibit will feature a new low-cost Model No. 176 polyethylene tube sealing and coding conversion unit that can be installed on standard Colton Model 17 or 175 fillers. The unit fits on the machine in place of the original folding and crimping heads for the metal tubes. Thus, one filler can handle either metal or plastic tube filling operations.



Colton Filling Line

**EASY DOES IT...
EASY SELLS IT!...
with Aerosols**



Magic Touch of Aerosol Packaging opens bigger markets for touch-up paints

"It's faster," say consumers. "It's easier. It's neater." These advantages of aerosol paints sold over 55 million cans in 1958—more than half again as many as in 1957!—and the market is still growing fast!

The paint field is now seeing the same kind of revolutionary sales impact that aerosol packaging has had on hair sprays and insecticides, shave creams and room deodorants. And if you're thinking of marketing aerosol paints or any other product in aerosol form, we'd like to help.

How General Chemical can serve you

As a leading producer of aerosol propellants, General Chemical provides a great many helpful services to present and prospective aerosol marketers. We will, for example, be glad to work with you to develop a formulation with the right pressures and compatibilities for your product and container.

We will direct you to many capable contract fillers in every part of the country who will put up your product in aerosol form for test marketing and handle

full commercial production as well. In this way, you can enter the aerosol marketplace without investing a cent in plant, special equipment or production personnel!

General Chemical services include:



New Product
Ideas



Technical Literature and
Market Data



Technical Assistance with
Product Development
and Formulation

For further information—or if you would like to arrange for a special presentation—write today to "Genetron" Dept., General Chemical Division, Allied Chemical Corporation.

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The new Colton-Hope rotary unscrambler operates in conjunction with a filling machine or other equipment. The unit has a case dump table, a 36-in. rotary disk, guide rail and automatic feed to the in-feed conveyor. The unscrambler will handle a variety of containers at a rate of speed that matches that of the filling machine or packaging line.

Other equipment to be on display are Model 106 Colton liquid filler with four fluid-ounce fill, a Model 19A Colton-Hope 6-line filling machine for one-pint containers, a Model 15RF2 Colton-Hope Filler for one-pint containers, a Colton-Alpha Model 1352-9 rotary vacuum crimper and a Colton-Alpha 1651-9 rotary pressure filler with zero to 120-cc heads.

Aerosol Marketing Heads CSMA Meeting

Marketing of aerosols keynotes the entire program scheduled by the Aerosol Division at the 46th annual meeting of the Chemical Specialties Manufacturers Association to be held at the Hotel Mayflower, Washington, D. C., Dec. 7-9.

On Tuesday morning, Dec. 9, when the annual meeting formally opens, the Aerosol Division will hear the following presentations: "Marketing of Aerosols Directly to the Home," by D. J. Templeton of Stanley Home Products, Inc.; "Marketing a Diverse Line of Aerosol Products," by S. C. Johnson, Jr., of S. C. Johnson & Son, Inc.; "Introducing a New Aerosol Product to the Consumer Market," by Peter Schaeffer of Glass Wax Co.; "Marketing Aerosols Through Chain Operations," by a speaker from Rexall Drug Co.; and "Study of Aerosol Distribution at Various Retail and Wholesale Levels," by a speaker yet to be announced. This program will be followed by the announcement of the aerosol packaging award winners by F. G. Lodes Aerosol Consultants, Inc.

The Aerosol Division meeting, the afternoon of Dec. 9, will hear Phil Libson of Max Factor on "Building Aerosol Sales through Better Packaging"; and H. E. Peterson of Peterson Filling and Packaging Co. on "New Developments in Aerosols." A symposium is scheduled on the subject of "Cur-

rent Developments in Solubilities of Aerosol Systems." Current research developments will be covered by speakers from Union Carbide Chemicals Corp., E. I. du Pont de Nemours & Co., General

Chemical Co., and Pennsalt Chemicals Corp. Listed as last speaker in this session is G. Barnett of Giant Food Stores, Landover, Md.; his subject: "What Grocery Chains Think of Aerosols."

Kiefer "Gas Jet" Fully Automatic

New fully automatic liquid propellant charging machine is offered either as a straight line or a rotary unit by Karl Kiefer Machine Co., Cincinnati, Ohio. The straight line machine can be supplied from 4 to 12 stations in increments of four. The rotary machine can be furnished with 8, 12, 16, 24 or 36 stations. The rotary machines assure smooth container handling and are recommended for high speed operation. However, the straight line machines, for this type service, have some very definite advantages:

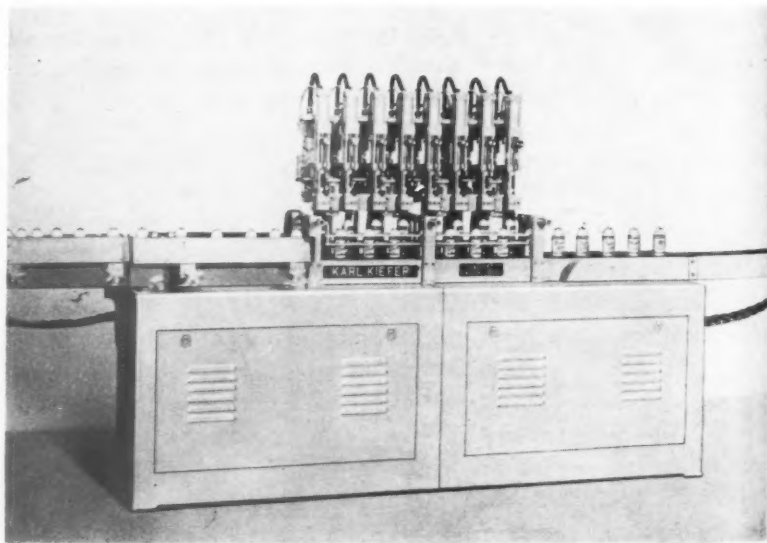
1. The stations can be individually adjusted while the machine is running with less effort than on the rotary.

2. The straight line machine is built sectionally, so additional units can be added, even after the machine is installed in the customer's plant, as his production requirements increase.

The can handling mechanism on the straight line "Gas Jet" is perhaps the fastest known to the in-

dustry. There is practically no intermittent motion in can feeding as one of two rows of cans goes into the machine exactly spaced by a worm mathematical timer. Shifter bars immediately and gently place the cans on the trays and under the charging stems. While this is being done, another row of cans is coming in from the rear conveyor of the machine so that as soon as the first row of cans is charged it is moved back onto its originating conveyor and discharged while the other row of cans is being moved under the charging stems. Cans are successfully handled at speeds of approximately 175-a-minute on a 12 station straight line machine provided the valve orifice and the amount of propellant are selected for this production.

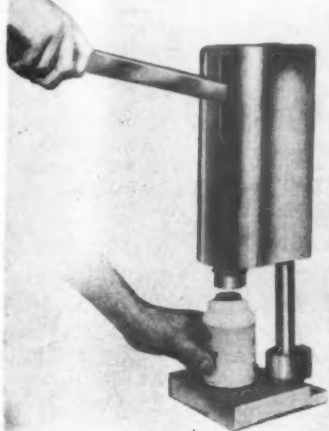
For both the rotary and the straight line "Gas Jets," the charging heads are unrivaled for accuracy and minimum gas loss. They require virtually no maintenance, as they are automatically lubricated. All Kiefer charging heads can be adjusted for volume with the greatest of ease.



Kiefer "Gas Jet"

New Crimping Machine Reported to Double Production

A new low-priced crimping machine for the aerosol field made by Aerosol Machinery Co., Westbury, L. I., is hand-lever operated



and needs no additional source of power. It is said to be able to double the production of presently marketed machines which, like this one, use no outside source of power. The single stroke lever system is so

designed that a short stroke affords multiplied leverage. It has a comfortable lever position which adds greatly to the ease of operation and high production claimed. Operator fatigue is so reduced that the unit is ideal for small lot production as well as laboratory work; it is also economical. The Amco Hand Crimper weighs only 35 pounds and has a keyway guided head which maintains the central position of the crimping jaws throughout all changes of container height. All moving parts are enclosed for operator safety; bolt-down holes are provided in the base for attachment at any line of production or to any laboratory bench. Parts and workmanship are guaranteed for 90 days.

Aeropak Expands

Aeropak, Inc., Chicago, is expanding its aerosol packaging capacity with the acquisition of new facilities at Kearney, N. J. at a plant formerly occupied by DuPont. These facilities will be operated by an affiliate company, Aeropak, N. J., with the Aeropak, Inc. sales organization assuming

sales responsibility for Aeropak, N. J. Aerosol filling and warehousing facilities at the explosion-proof plant began full operation August, 1959.

Best Aerosol Packages To be Featured at Chemical Specialties Show

The Eighth Annual Aerosol Package Contest, to select the best aerosol packages of the year, will be held in conjunction with the 46th annual meeting of the Chemical Specialties Manufacturers Association at the Mayflower Hotel, Washington, D. C., December 7-9, 1959.

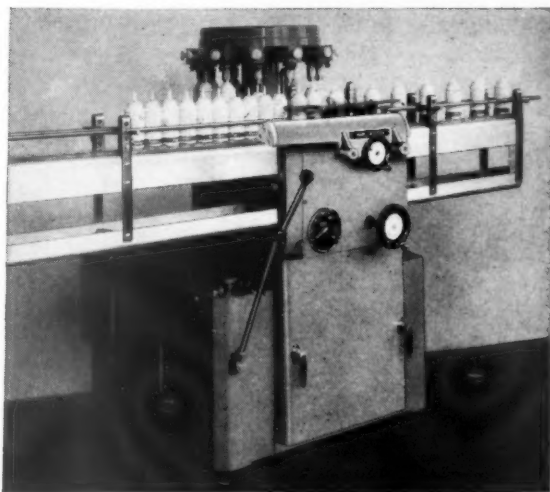
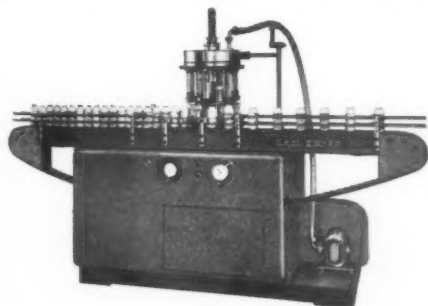
There will be several classes of entries and the contest is open without fee to any brand owner or marketer of aerosols and pressurized packages. Awards will be made on the basis of general sales appeal of the packages.

Rules of the contest and entry blanks will be sent upon request to the Chemical Specialties Manufacturers Association, Aerosol Awards Committee, 50 East 41st Street, New York 17, N. Y.

KARL KIEFER "GasJet" CHARGING UNIT

Straight line or Rotary—any speed
FOR LIQUID AND GASEOUS PROPELLANTS

There is a Kiefer product FILLING MACHINE to satisfy your every need, for measuring liquids and semi-liquids.



KIEFER CADET MODEL VARI-VISCO FILLING MACHINE

With automatic feed and discharge conveyor—handles paints, varnishes and oils to perfection. "Bottom-up" fill gives viscous materials a solid volumetric pack. . . also a liquid fill, without splash.

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Leaded ZINC OXIDES

**meet exact
requirements
of paint industry**

CO-FUMED TYPE LEADED ZINC OXIDES

AZO 35-L. 35% leaded zinc oxide of low consistency.

AZO 50-L. 50% leaded zinc, low consistency.

AZO 18-L. Highly basic, low consistency type.

All co-fumed leaded zinc oxides are easily mixed and incorporated in paint vehicles.

BLENDED TYPE LEADED ZINC OXIDES

AZO 20-B. Acicular type of 20% leaded zinc oxide. Excellent color, medium consistency.

AZO 35-M. Acicular type of 35% leaded zinc oxide. Excellent color, medium consistency.

Blended type leaded zinc oxides generally give higher consistency (or oil absorption) and improve the color of the product.

Paint manufacturers in increasing numbers are using economical leaded zinc oxides in their exterior paints. To meet this growing demand, a number of AZO leaded zinc oxides have been developed, and are immediately available.

In addition, we are prepared to produce oxides of any lead content and consistency to meet the requirements of special formulas. You can be sure of the right leaded zinc oxide for your product when you specify AZO.

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NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



DESPATCH

TESTING OVEN

Features Observing Work

Experimental and testing oven offers features for observing work in chamber. According to the company, this oven equipped with an inner glass door, allows operator to observe his product while it is in the oven. This feature is said to benefit such experimental and testing work as: baking finishes on metal, plastic, cloth and other products that should not be removed from oven during baking period.

Further aid to better observation of individual samples while in the oven is provided by revolving sample holders. These sample holders placed at ends of seven extension rods can be rotated so that any desired sample can be placed before the viewing door. This permits inspection without opening door and without altering temperature on other samples in the oven.

Oven has vertical flow convection heat. Two swing type high temperature glass inner doors. External knob with indicating num-

bers to mark special samples to facilitate selecting samples for viewing. Cabinet is available in stock sizes I. D. 24" x 24" x 18" to I. D. 38" x 42" x 45".

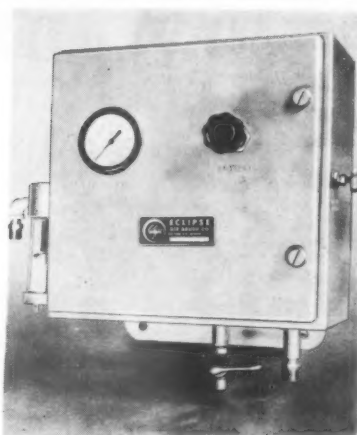
Despatch Oven Co. EM-1

TIMER

Installed on Spray Equipment

New compressed air operated timer which can be quickly installed on automatic or semi-automatic spray equipment has been announced.

Although the timer was developed for spray painting cycles ($\frac{1}{2}$ - 30 seconds) it is particularly well suited to control any operation in



ECLIPSE

explosive, abrasive, or corrosive atmosphere.

The timer is initiated by just a pulse of compressed air from a manual or cam operated valve supplied with the unit. An important feature of this timer is that its cycle is repeatable within 10 per cent regardless of variations in the initiating pulse.

The unit is supplied in a steel box and includes a filter oiler to provide long trouble free operation. Installation is so simple that only a wrench is needed to connect a compressed air supply.

Eclipse Air Brush Co. EM-2

ZINC STEARATE

For Use in Sanding Sealers

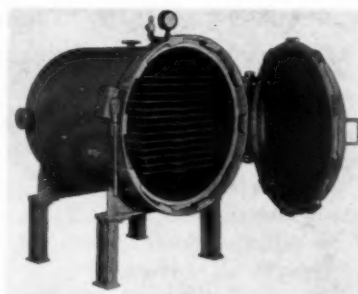
New stir-in zinc stearate, for use in sanding sealers, has been announced.

The new sealer is a fine, white powder that can be mixed, without grinding, in either lacquer or thinner to produce effective sanding sealers. Moreover, it is bloom resistant.

According to the manufacturer, the new product offers many advantages not found in competitive sealer components:

- 1 - It stirs more readily into the sealer.
- 2 - It produces a film having a finer degree of dispersion.
- 3 - It has a slower sedimentation rate.
- 4 - It has better color.
- 5 - It has less gumming effect on sandpaper.
- 6 - It allows proper sanding in 20 to 30 minutes after application.
- 7 - It does not effect the water resistance of the sealer.
- 8 - It is bloom resistant.

Metasap Chemical Co. EM-3



BOWSER

HORIZONTAL LEAF FILTER

Uses Filter Cloths or Filter Papers

New filter utilizes permanent media in the form of filter cloths or inexpensive filter papers. In addition to the conventional, horizontally-mounted filter leaves, the filter features an added bottom leaf

N E W
MATERIALS — EQUIPMENT

contoured to the case so all liquid in the tank can be filtered out at the end of a cycle.

Time saving claimed by the manufacturer, due to the accessibility of filter leaves, permits one-man cleaning in 4 to 15 minutes depending on size. Filter cake may be hosed out without removing filter elements.

Bowser, Inc., Process Filters Div. EM-4

SUSPENSION SCALES

Calibrated to 1/10 of 1 Per Cent

New line of automatic suspension scales, embody a number of

advancements that make them of particular value in industrial applications.

Most important feature lies in the accuracy of this new unit. It is calibrated with certified test weights to an accuracy of 1/10 of 1% and is officially sealed by the Bureau of Weights and Measures prior to shipment.

Model P has a highly legible, 16" diameter dial and is available in the following capacities: 0-250, 0-500, 0-750, 0-1000, 0-2500, 0-5000, 0-7500 and 0-10,000 pounds. Principle of operation is based upon compound levers. The mechanism is fully dampened against vibration or flutter. Safety factor is 5-1 in capacities up to and including 5000

pounds and better than 3-1 in the 7500 and 10,000 pound ranges.

A convenient reset or tare adjustment knob is provided on the Model P so that weight of slings, pallets or chains may be quickly and easily canceled out. A further refinement is claimed for the ball bearing swivel hook which revolves freely under maximum load a full 360° in either direction. In addition, it will arc 27° to accommodate material pickup at an angle.

Model P scales have a net weight of 56 pounds and thus can be readily carried by the operator to various plant locations where needed. Being temperature compensated, they are unaffected by the extremes of foundry room heat or the sub-zero of outside storage yards. In addition to hoist or crane applications, they may also be utilized with fork lift trucks, being suspended from a cross-bar on the fork.

W. C. Dillon & Co., Inc. EM-5

Solve your problems



O.K. FOR SHIPMENT

**before they
reach the can**

Baker's high-quality additives, THIXCIN® and M-P-A®, are basic insurance for a high-quality paint.

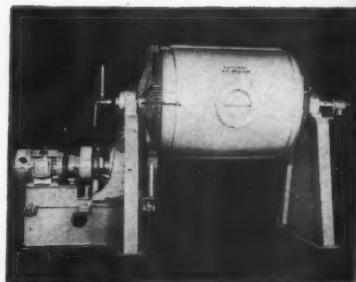
When your paint contains one of these Baker additives, you insure no settling . . . no sagging. You also insure flow control and easy brushing.

THIXCIN® . . . the superior additive for paints processed at moderate temperatures and employing low KB solvents and oil vehicles. M-P-A . . . the non-seeding additive for processing at higher temperatures, effective with all solvents.

These additives were developed solely by Baker. No other additives are backed by the same know-how, experience and service. Ask the paint man who uses them.

THE Baker ESTABLISHED 1857 **CASTOR OIL COMPANY**
Bayonne, New Jersey

6644



PATTERSON

REACTOR

Mixes Materials Uniformly

The Mil-Reactor, a new tool for performing multiple operations in a single processing unit, is said to combine the functions of a ball mill and a reactor. The unit reportedly makes possible grinding in the presence of carefully controlled temperature and pressure conditions. Access lines permit addition of liquids, slurries or gases while the mill is in operation. Also, vapors may be removed while solids are being dried.

The reactor will mix materials uniformly while they are being reacted, maintaining desired heat transfer rates and producing material of desired particle size. It is available in sizes from 5 to 500 gallons working capacity. Internal pressures may be controlled between full vacuum and 50 psig. The heat transfer jacket is suitable for pressures to 125 psig and can

Some Fresh Paint Ideas



New and Better Silicone Resins Open New Areas of Use

Have you looked into silicone resins recently? We stress *recently* because today, silicone resins do more things better . . . open new areas of use. Properties are improved: heat resistance, always exceptional, is now available in more versatile resins . . . weathering and gloss retention are better than ever . . . many more air-dry vehicles and intermediates are now readily available. In short, it's time for a quick review . . .

For High-temperature Coatings

Dow Corning resins for high-temperature maintenance finishes have been steadily improved since their introduction. These "straight," or un-modified, silicone vehicles are without parallel for film integrity at 1,000 F; have excellent resistance to salt spray and other corrosives. They provide good protection for years on plant equipment and on many consumer products as well.

For Product and Industrial Color Finishes

Modified silicone vehicles are now available for making color-coded maintenance paints or for product finishes. Coatings based on these resins have demonstrably better gloss, color retention and resistance to chalking than even specially-formulated organics. Resistance to heat, abrasion and impact, coupled with light weight and ease of application, make them

a good replacement for porcelain in product finishing. Some current applications: food store display cases, home and commercial barbecues, space heaters, and appliances. The same characteristics, plus excellent weathering, result in longer lasting maintenance paints for industry. Now you can produce paints in a full range of colors for more consistent and better coding of all plant installations including hot equipment.

Manufacturing Your Own Resin

Dow Corning continues to develop and produce silicone intermediates for you to react with alkyds, oils, or other coating materials. As little as 25% of a silicone intermediate, on a final resin solids basis, can bring a tremendous improvement in properties. You can vary the formula to achieve greatly different vehicles from baking to air-dry. Cold-cutting resins are also available.

Write today for information. Please specify whether you're interested in resins or intermediates. Address Dept. 4123.

Your nearest Dow Corning office is the number one source for information and technical service on silicones.



Dow Corning CORPORATION
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

NEW MATERIALS — EQUIPMENT

be used for either heating or cooling. Patterson Foundry and Machine Co., EM-6

SPRAY

Eliminates Washups

New pushbutton aerosol product for the paint and varnish industry will increase the daily output of roller mills by eliminating the washup at the end of the days work. A quick spray application on the rollers and hopper just before shut down time will prevent all resins, inks, varnishes or grinding vehicles from skinning or drying overnight or over the weekend. To

start up production again simply throw the switch and the mill is off to a flying start with full speed production in seconds.

Manufacturer claims that the spray will not affect the vehicle, pigment or batch it any way and is harmless to roller mill parts. It can also be sprayed on the mill during lunch time shutdowns to prevent skinning or drying. When sprayed on the inside lining of cans before the filling operation you can be assured on no skinning even after shipping. Unfinished batches of paint, ink or varnish can also be protected against skinning.

Acrolite, Graphic Arts Div. EM-7

MILTON CAN ANNOUNCES:

New Paint Packaging Protection

MILTON LINED CANS' PROTECTIVE COATING HELPS PREVENT ON-THE-SHELF PAINT DETERIORATION



Notice the way MILTON lined cans are made...Observe the time-tested coating on *both* sides of the friction ring and the extra, inert compound which seals off the raw edge of that ring.

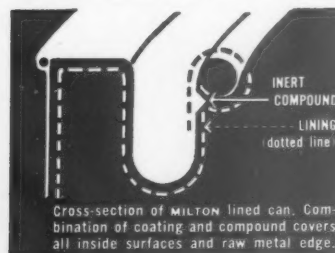
Why are these features important? Because they reduce corrosion—the chief cause of paint discoloration—and increase your products' shelf life.

MILTON CANS can do this because the extra compound used to line the can

ring forms a permanent, impervious film that prevents paint contact with the raw metal edge; the interior of the can is completely protected.

In MILTON lined cans, latex and PVA paints stay fresh, clean, salable.

MILTON makes a complete line of cans — lined, unlined, lithographed, stock, and to order. Quick delivery. Telephone or write for complete information.



Cross-section of MILTON lined can. Combination of coating and compound covers all inside surfaces and raw metal edge.



GEORGE A. MILTON CAN CO.

131 North 14th Street, Brooklyn 11, N. Y.
E'Vergreen 3-1100
Our 32nd Year



BLUE-M

JAR BATH

Ambient to 70°C or 100°C Range

Maximum utilization of working area (99.9%) plus patented and proven design features of new jar baths incorporating full visibility, complement their extreme versatility of operation, the manufacturer says.

The unique method of agitation of these baths is said to maintain constant uniformity by gentle and automatic pulsation of the agitator plate. Constancy of uniformity is $\pm 0.10^\circ\text{C}$. Redesigned quality dual control allows automatic selection and repetition of two most used temperatures or serves as an excess temperature cut-off.

The packaged control compartment located at top of bath is easily removed as a complete unit to permit cleaning. Temperature ranges of the jar baths: Ambient to 70°C. or 100°C. These jar baths are recommended for use in A.S.T.M. kinematic viscosity tests, medical and clinical use, and for general laboratory use.

Bluem Electric Co. EM-8

COPOLYMER EMULSION

Mechanical Stability

Production of a new borax stable polyvinyl acetate-dibutyl maleate copolymer emulsion has been announced.

Designated Resin D-243, the emulsion is said to be unique because it combines borax tolerance with a high degree of compatibility with organic solvents. The product has a particle size distribution of from 0.2—1.5. In addition, the resin is reported to have superior flow characteristics, excellent freeze-

NEW MATERIALS — EQUIPMENT

thaw and mechanical stability. Films cast from the new resin have the advantages usually associated with internal plasticization such as improved film forming characteristics and low temperature flexibility without the need for additional plasticization.

Resin D-243 is suggested particularly for use in adhesives, and also in textile finishing, as a cement additive, in paper coatings, surface coatings and as a beater additive in paper manufacture. Shawinigan Resins Corp., EM-9.



SURETY

GLOVES For Skin Protection

Perfect hand protection against hi-power solvents is now said to be possible with new coated fabric gloves

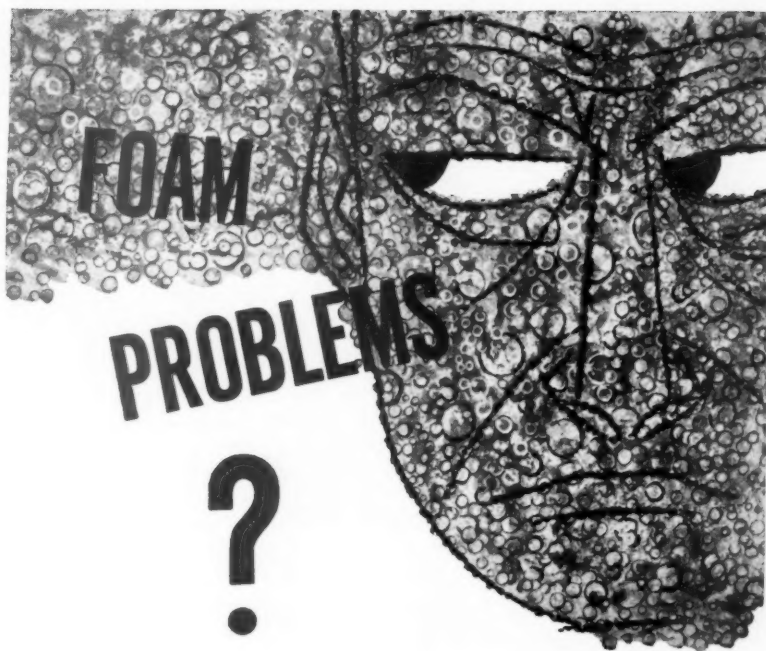
Specially designed and treated for safe, effective handling of ketones, acetones and paint-stripping compounds and other hard to handle solvents, these gloves are light weight with curved fingers, wing thumb construction and blunt finger ends for complete hand comfort. And their built-in ruggedness and durability adds longer on-the-job life to every pair. Surety Rubber Co., EM-10.

DRUM HANDLER No Springs

New drum handler is designed to pick up every type of drum. According to the manufacturer, drums can be securely gripped, one or two at a time. The heavier the drum—the tighter the grip. Drums are released only when they are set down.

The gripping head consists of two hardened jaws which grip the bead. No springs are used.

Mounted on the carriage, slipped



Solve your foam trouble in seconds with ELDO DEFOAMERS

Defoamer ED
for butadiene, acrylic,
PVA base paints.

Eldefoam 400
for Polyvinyl acetate paints,
especially where "fisheyes"
present a problem.

SPECIFY Foremost El Dorado's use-tested defoamers, made especially for the paint industry, for your toughest foam problems.

Defoamer ED and Eldefoam 400 do these jobs: act as defoamers and anti-foamers; as wetting agents; and as suspension aids to prevent settling. Foremost also supplies the Paint Industry with a complete line of Coconut Oil Fatty Acids and Methyl Esters. Call your Foremost man today or write for samples and specifications.



Dept. F-1

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Cleveland: F. W. Kamin Company	Detroit: Harry Holland & Son, Inc.	Houston: Joe Coulson Company	Kansas City: Vulcan Sales Company
Minneapolis: M. H. Baker Company	New Orleans: Brefeith & Sheahan Company	New York: H. Reisman Company	
Oakland: Foremost Food & Chemical Co.	Oklahoma City: Ruilman Brothers	St. Louis: Harry A. Baumstark & Company	

**NEW
MATERIALS — EQUIPMENT**

on the forks or over the lip of a shovel, the new handler can be used for either constant or intermittent drum handling. It is said to eliminate manual handling of drums.

Little Giant Products, Inc. EM-11

PUSH-OFF DEVICE

For Take-It or Leave-It Systems

New push-off device with side shifter and multiple forks has been developed.

This special attachment is a product specifically designed and manufactured for establishments

using a take-it or leave-it pallet system. This is the system whereby unit loads are handled in process and placed in storage on pallets but are shipped without pallets. The take-it or leave-it pallet is basically a standard double-faced wood pallet with the addition of 4 or 6 two-inch square stringers equally spaced and nailed across the top boards. Corrugated steel pallets specifically designed for this system are also available. The multi-purpose equipment is capable of handling the palletized unit loads in process and storage and also the non-palletized loads during shipment. During process and in storage the palletized loads are handled in the conventional manner. When loading carriers, the

multiple tined forks are slid between the small stringers on the top of the pallet and the load raised off. The load is then moved to the carrier and pushed off the forks.

Lewis-Shepard Products, Inc. EM-12

VACUUM PUMP

Easy to Clean

New easy-to-clean vacuum pump handles liquids up to the consistency of syrup, as well as powdered solids that have a tendency to "slump" or seek their own level. Lift of the pump, it is stated, is approximately 25 feet of water at sea level. Material passes through sanitary tubing from the sampling source directly to the sample container reportedly never coming in contact with any part of the pumping unit. It reaches spots that are inaccessible to other pumps.

Motive power is provided by the vacuum created in the sampling container on the up-stroke of the pump handle, it is pointed out. Easy cleaning and low maintenance are additional advantages listed. W & W Manufacturing Co. EM-13

VIBRATOR

Produces Straight Line Vibration

New dual motor vibrator-gear for synchronous action, produces straight line vibration, in any direction. This unit operates on a rotating eccentric weight principle and features adjustable eccentrics, permitting force of vibration to be varied without changing weights. There are four weights, two on each motor, contra-rotating. Variable impact range is from 640 to 2200 pounds and any impact change can be made in a matter of minutes. Because there are no pulleys or belts within this totally-enclosed vibrator, operation is practically noiseless. Ideal for heavy duty applications requiring continuous flow of weight bulk materials. . . prevents sticking, arching or bridging.

Specifics include: weight, 100 pounds; dimensions: width 12-5/8 inches; length 12-5/16 inches, and thickness 7-1/8-inches. Input is 1000 watts, and Model RC-31 is obtainable for 220-volt, a-c., 3-phase, 60 cycle power. Cleveland Vibrator Co. EM-14



**Which paint has been extended
with high-brightness Dicalite?**

As much as 20% of expensive pigments such as TiO_2 can be replaced with high-brightness Dicalite — and neither eye nor instrument can detect any loss of whiteness and brightness. No other diatomite extender surpasses the brightness of Dicalite filler-pigments. And in all the other properties you demand in a diatomaceous silica — easy grinding, fine particle sizes, correct particle size range and distribution — Dicalite meets your strictest standards.

Dependable
GLC
GREAT LAKES **Dicalite**

**Filler-Pigments WB-5, L-5, and White Filler
have an average brightness of 90 on the GE scale**

Dicalite Department, Great Lakes Carbon Corporation
612 South Flower Street, Los Angeles 17, California

NEW MATERIALS — EQUIPMENT



BRABENDER

VISCOSIMETER Fifteen Paddle Designs

New, fully recording, completely linear viscosimeter measures viscosity of practically all fluids such as epoxies, gels, starches, inks, paints, plastisols, chocolate, catsup, glues, oils, tars, pastes, clay, milk, cements, etc. Changes in viscosity are automatically recorded providing useful information from the plotted curves. Conversion from Brabender units already in use to other viscosity units may be readily made, since the new instrument is completely linear.

Other features of the viscosimeter, according to the company include a stepless variable speed drive (20 to 200 rpm), disposable paddles and sample containers and interchangeable tension spring cartridges from 125 to 2,000 cmgms.

C. W. Brabender Instruments, Inc. EM-15

VALVE Stainless Steel

New valves are offered with handwheel for manual operation (where the amount dispensed may be determined by the handwheel travel), and motor-operated with pulley, sprocket wheel, or flexible shaft drive for remote or process-controller operation on constant or cyclic flows.

The unit represents features of design which offer rapid and complete accessibility to bearings and

gear train. It regularly features standard 150 lb. ASME 3 in. flange on suction side for connection to tank, reactor, etc. Tapered conical suction port design offers minimum resistance to sluggish media. Threaded discharge port is $\frac{3}{4}$ in. Stuffing box is accessible for replacing without dismantling valve, and can be repacked while in system without leakage.

The valves are offered in type 316 stainless steel, ni-resist, and aluminum. Gears are of stainless steel, Hastelloy C or B, ni-resist, monel, or nickel, with replaceable carbon or ceramic wear plates and carbon, self-lubricating bearings.

Eco Engineering Co. EM-16

UNSATURATED ALCOHOL High Heat Resistance

A new, reactive unsaturated alcohol, Cyclol, is for the first time being offered in commercial quantities to the chemical industry. Cyclol is a product of Interchemical research and is now offered for general sale as part of Interchemical's diversification into new but related fields of chemical activity.

Interchemical Cyclol—a stable water-white liquid—combines in a single structure a reactive double bond and a primary hydroxyl group. Chemically, Cyclol is 2-hydroxymethyl-5-norbornene. It can be utilized through reaction of the hydroxyl group, the double

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READERS' SERVICE

Use this handy self mailer to obtain further information on the new raw materials and equipment discussed in this section.

Check desired items below; write name and address on reverse side; and mail.

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| <input type="checkbox"/> EM-7 | <input type="checkbox"/> EM-14 | |

**NEW
MATERIALS — EQUIPMENT**

bond, or both, to yield many useful products.

Cyclol is suggested for the modification of condensation and addition polymers for use in coatings, plasticizers, lube oils, adhesives and leather, textile and paper finishes. Modification with Cyclol serves to improve the compatibility, pigment wetting and heat and chemical resistance of these polymers. Derivatives of Cyclol may find possible use in odorants, insecticides, pharmaceuticals and other compounds. Cyclol is a powerful high-boiling solvent and is miscible

with most common solvents. Interchemical Corp. EM-17

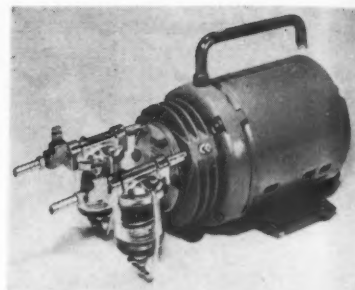
PORTABLE PUMP

Either Vacuum or Pressure

New compact, portable pump which provides either vacuum or pressure, and employs only a rotor and four vanes as moving parts has been announced.

The rotor is mounted integral to the motor shaft and the non-metallic vanes assure quiet operation. Adjustable air vents are provided on both inlet and outlet ports, to produce any degree of pressure or vacuum up to the maximum.

Lubrication is provided by the incoming air stream which picks up minute droplets of oil from a



CENTRAL SCIENTIFIC

saturated wick before passage into the pumping chamber.

An exhaust filter is provided to remove oil vapors and also serve as an efficient noise muffler.

The unit will provide vacuum up to 27 inches (mercury), and a maximum pressure of 25 psi may be utilized. Free air capacity is approximately 1.3 cubic feet per minute.

It operates with a 1/4 hp motor at 1725 rpm on 115-volt, A. C. current, with thermal overload protection.

Central Scientific Co. EM-18

PLASTIC WHEEL

For Storage Rack

New plastic wheel developed especially for live storage racks has been introduced. Consisting of an exclusive wheel and bushing design, the plastic wheels are not only lower in cost than standard-type steel wheels but also have greater load-bearing capacity when used with all but hard surfaced items.

The full 5/8" flat tread of the wheels is approximately 60 per cent greater than the carton supporting surface of the standard steel wheels. The result is 25 per cent higher load-bearing capacity per wheel when used with cartons and similar items.

In use at several test locations, the wheels have already proved themselves to be equal to or superior to steel wheels, the company reports. In addition to better load-bearing capacity, the plastic wheels are said to be lighter in weight and have excellent resistance to corrosion.

The bushing design provides a foolproof method for locking the plastic wheels in place. When slipped onto the axle, the bushing grips into the axle notch with such force that, once in place, the assembly is permanent.

N-H Standard Corp. EM-19

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READERS' SERVICE

SEPT. 1959

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THOUGHTS ABOUT PROFIT...

"The materials of action are variable; the use we make of them should be constant."

EPICTETUS

Offerings in the market place are frequently affected by circumstance. Yet the wise manufacturer measures his raw material source not by price alone, but by the yield to be derived from the quality, service, and technical performance that are delivered.

We believe that the maximum in polyol values can be secured by adopting Hercules® Pentaerythritol as a standard for all comparison.



SYNTHETICS DEPARTMENT

HERCULES POWDER COMPANY

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PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries \$1.00 per copy) to the publisher.

Corrosion-Resistant Coatings

U. S. Patent 2,889,305. Stanley L. Lopata, Ladue, Mo.

A coating composition comprising an epoxy ether resin having a 1,2-epoxy equivalency of two and an oil which is distilled from coal tar in the temperature range of 200°C. to 320°C.

Storage-Stable Pastes, Paints Containing Aluminous Pigments

U. S. Patent 2,904,523. Robert L. Hawkins, Jr., Gates Mills, and Edward G. Bobalek, Cleveland Heights, Ohio, assignors to The Empire Varnish Co., Cleveland, Ohio, a corporation of Ohio.

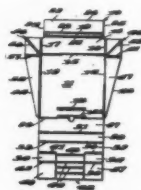
A polychrome paint comprising (A) a storage-stable mixture of an aqueous dispersing liquid of pH between 2 and 11 consisting essentially of (a) 30% to 99% water by weight, (b) a water-soluble inorganic hexavalent chromium salt present in a weight ratio of about 0.005 of salt to 1.0 of water, and (c) the balance water-miscible protective colloids; (B) dispersed particles of water-insoluble polymers of at least one monomer of the vinylidene group, said particles having an average particle diameter of 500 to 20,000 Angstrom units; and (C) a mixture of aluminum powder and other water-insoluble pigments with

a weight ratio of from 0.001 to 10.0 of the former to 1.0 of the latter, the weight ratios of (C) to (A) ranging from 7 to 5 on one hand to 1 to 90 on the other and the weight ratios of (C) to (B) ranging from 3 to 2 on one hand to 1 to 59 on the other.

S storage-stable paint according to claim 7 using a water-dispersible solubilized casein as a thickener.

Fiberboard Package For Paint

U. S. Patent 2,905,371. Floyd C. Huff, Timonium, Md.



A fiberboard tray for holding a supply of paint comprising, a rectangular panel forming a bottom of the tray and sloping downwardly from a first end to a second end, flaps integral with the sides of said panel arranged at right angles with respect thereto forming side walls for the tray, a substantially straight upper edge on each side wall substantially flush with the upper surface of said panel adjacent said first end and continuing horizontally to positions above the second end of said panel, an end flap integral with said panel at the second end thereof extending upwardly therefrom and forming an outer element of an upright end wall at the second end of the tray, a triangular shaped folded auxiliary flap integral with each side wall and integral with one end of said end flap with triangular shaped parts of said auxiliary flaps in face-to-face engagement, additional flaps carried by said end flap folded over said auxiliary flaps and forming an inner element of said end wall, flaps carried by said panel at the first end thereof folded thereunder forming a rib under said panel at the first end of the tray, a tongue carried by a central portion of the last-mentioned flaps extending upwardly through a slot in said panel adjacent the first end, said tongue overlying an upper face of said panel and extending downwardly through another slot in the panel terminating within said rib holding the last folded flaps as a tray supporting rib under the first end of said panel.

Lacquer and Diisocyanate

U. S. Patent 2,904,532. Hugo Wilms, Leverkusen, Otto Bayer, Leverkusen-Bayerwerk, and Wilhelm Bunge, Leverkusen, Germany, assignors by mesne assignments, to Mobay Chemical Co., Pittsburgh, Pa., a corporation of Delaware.

COMPATIBLE!

This is the key word with Kodis Universal Color Concentrates. Compatible with both water and oil systems, Kodis concentrates are sold at 50% solids or better, and are pre-standardized to maintain highest performance. This means workability, quality and inventory savings compatible with your own needs and objectives. Maximum dispersibility in glass and semi-gloss enamels, easily incorporated in alkylid flake. Superior stability, alkali and light resistance. Excellent working properties in latex emulsion paints, Styrene-Butadiene, Polyvinyl Acetate and Acrylic.

You can send for samples and brochures, of course. But it's a lot faster to take your color problem directly to our sales service laboratory. Call today.



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Just Tip and Pour

New free-flowing Du Pont Dense Nitrocellulose makes handling easier and safer

There's no digging, no pitchfork prodding to fray tempers and undermine work schedules when your men unload the new Du Pont Dense Nitrocellulose. It is completely free-flowing at all times—right to the bottom of the drum!

Add to its ease of handling and greater safety the fact that you get a freight and space saving, up to 80 additional pounds per drum, and you have four new reasons for specifying Du Pont Dense Nitrocellulose. Field tests show that it goes into solution easily, too.

For complete information and specifications, contact your Du Pont representative or write: Du Pont, Explosives Department, Room 6539 Nemours Building, Wilmington 98, Del.

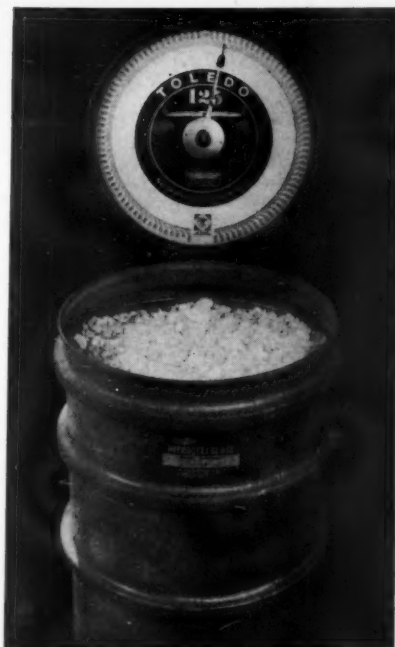


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A lacquer comprising a mixture of (1) an organic polyisocyanate, (2) a member selected from the group consisting of (a) a product obtained by reducing carbonyl groups of an ethylene-propylene-carbon monoxide copolymer to secondary hydroxyl groups and (b) a product obtained by reacting an ethylene-propylene-carbon monoxide copolymer with formaldehyde to introduce methylol groups, and (3) an organic solvent.

Phosphor Coating

U. S. Patent 2,905,572. Shannon Jones East Cleveland, Ohio, assignor to General Electric Co., a corporation of New York.

The method of forming a phosphor coating of improved adherence on a glass surface which comprises preparing a suspension of finely divided inorganic phosphor in a solution of organic binder which is decomposable upon heating and

of a consistency suitable for flowing on the glass surface, adding to the suspension a small amount in the approximate range of 1 to 4 percent by volume of an additive comprising essentially a solution compatible with the suspension and containing calcium nitrate and a material of the class consisting of boric oxide and derivatives thereof which yield boric oxide upon heating and having a CaO:B₂O₃ molar ratio of from about 3:1 to 1:2, flowing the resulting suspension onto the glass surface, drying the coating so formed and firing it at a temperature and for a time sufficient to decompose the binder and effect a reaction between the calcium nitrate and boric oxide components of the additive.

Synthetic Drying Oils

U. S. Patent 2,902,457. Charles J. Marsel, New York, and John Hoppel. Yonkers, N. Y.

An improved, impact stable, drying oil composition obtained by heating at temperatures of 50° to 200°C., until substantially complete polymerization of the polymerizable components has occurred, of substantially stoichiometric reactive amounts of a polymerizable acetylenic monomer selected from the group consisting of methyl divinyl acetylene and 2-methyl-5-hexene-3-yne-2-ol with a drying oil composition selected from the group consisting of at least one naturally occurring drying oil, a drying unsaturated acid of such drying oil, and mixtures thereof.

Fire-Retarding Roof Coating

U. S. Patent 2,893,889. Clyde C. Schuetz, Prospect Heights, and Richard Ericson, Park Ridge, Ill., assignors to U. S. Gypsum Co., Chicago, Ill., a corporation of Illinois.

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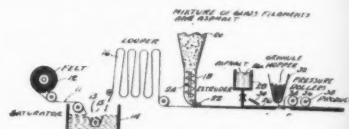
Write for technical literature.
Samples available on request.



WET GROUND MICA ASSOCIATION, Inc.

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NEW YORK, N. Y.



Process of making a fire-retarding building covering material which comprises the step of applying to a bitumen-saturated base sheet a layer of a bituminous coating composition containing from about one-quarter percent to not substantially more than five percent by weight of interfelted drawn glass filaments of a length not substantially less than three millimeters, said latter percentage being based on the combined weight of said bituminous binder and glass filaments, each filament having a substantially uniform diameter within the range of from about one-half to not substantially more than about four microns.

Coating Compositions

U. S. Patent 2,904,526. Heinz Uelsmann, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y., a corporation of New York.

A coating composition comprising, dispersed in water, at least 2% by weight of a zinc-ammonia-polymer complex formed by combining (1) aqueous ammonia, (2) a divalent zinc compound soluble in the former and selected from the class consisting of zinc oxide and zinc hydroxide, and (3) an interpolymer of a monomeric mixture comprising from about 80 to about 97% of an alkyl ester of acrylic acid in which each alcohol residue contains from 1 to 3 carbon atoms and from about 3 to about 20% of acrylic acid, said interpolymer having a molecular weight such that the viscosity of an aqueous ammoniacal solution containing 25% total polymer solids is not more than about "Z-6," as measured by means of the Gardner-Holdt viscometer tubes at room temperature.

Heyden looks at the classics



Francisco Goya (1746-1828). *The Forge*. Courtesy The Bettman Archive.

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Heyden Newport Chemical Corp., 342 Madison Ave., N. Y. 17, N. Y.



TECHNICAL

Bulletins

INDUSTRIAL FOAMING

Discussion of industrial foaming problems is now available. What causes foaming? How can you control costly foaming problems? Answers to these and many other questions are given in an illustrated, eight-page bulletin, entitled, *G-E Silicone Antifoams*.

This publication, explains how to choose the proper defoamer for both aqueous and non-aqueous systems. Also included are valuable recommendations on the equipment and methods to use in obtaining maximum performance from chemical defoamers. Of particular interest to laboratory personnel are techniques for easily evaluating the effectiveness of defoamers for a specific system.

General Electric Co., Silicone Products Dept., Dept. PVP, Watford, N. Y.

ORGANIC CHEMICALS

New catalog of aliphatic organic chemicals has just been released.

The 10-page publication lists specifications and chemical composition of long and short chain saturated fatty acids, oleic, and unsaturated fatty acids. Typical applications for each product are also given.

In addition, the chemical and physical properties of over 150 fatty acid derivatives are listed. Armour Industrial Chemical Company Dept. PVP, Chicago 90, Ill.

LABORATORY INSTRUMENTS

New twelve-page, two-color catalog of laboratory centrifuges, homogenizers, ultra-microtomes other instruments and accessories has just been issued. The new literature details a unique tube-type continuous flow system, the all-new RC-2 automatic superspeed refrigerated centrifuge, as well as automatic and enclosed table-top centrifuges in the Superspeed (0 to 20,000 rpm) range. Also illustrated and described are many different rotors for varied applications. They include a horizontal bucket-swing-

ing rotor, a particle-counting and virus rotor, a large capacity rotor, superspeed rotors and others. Smaller centrifuges for routine batch operations, blood separations, and a multitude of other tasks in biological, clinical and industrial laboratories are featured. An interesting aspect of all the centrifuges is their versatility in accepting a wide range of tubes and adapters, and their adaptability to routine or special work.

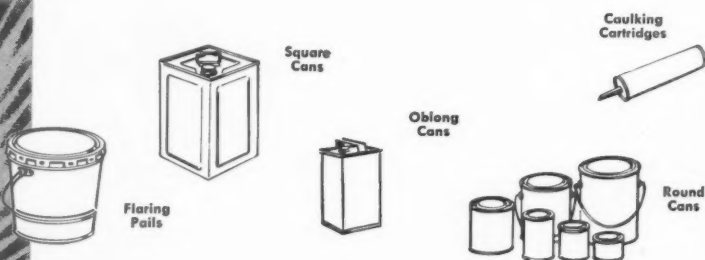
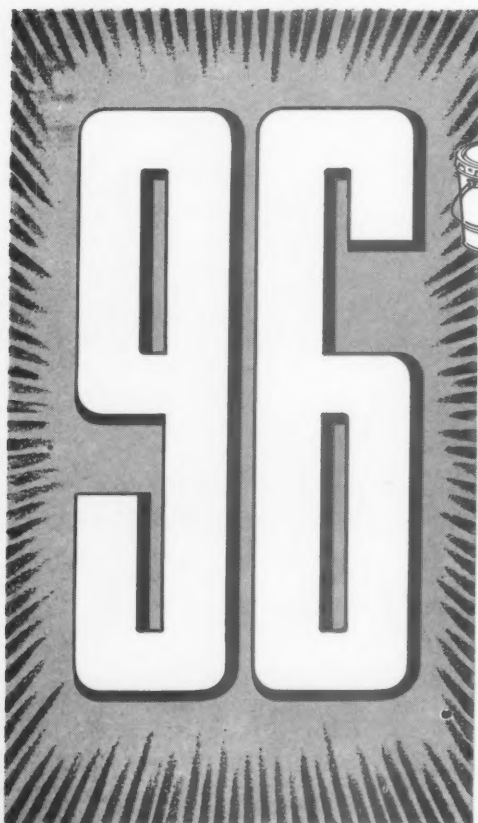
A new micro-attachment for the omni-mixer enables this standard-size homogenizer to process single milliliters of material.

Ivan Sorvall, Inc., Dept. PVP, Norwalk, Connecticut.

CHEMICALS

New 1959 *Fisher Chemical Index* (Catalog 123) describes 7000-plus chemicals in one easy-to-use alphabetical listing.

There is a significant saving in time to the buyer who can find all his chemical needs in one catalog instead of having to search through 3 or 4. The catalog alone makes this possible, by combining the lab world's largest, most comprehen-



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sive assortment of chemicals in one book.

The index should see steady service as a reference work; it gives structural formulas, formula, weights, melting and boiling points color index numbers. It is the laboratory's key to America's largest source of high-purity reagents. All of the American Chemical Society's specified reagents are included here.

It also contains instructions on how to store chemicals; defines the various purity grades; and reproduces in miniature a chart of emergency treatments for laboratory mishaps.

Fisher Scientific Company, Dept. PVP, 384 Fisher Building Pittsburgh 19, Pa.

MOTO DRIVES

New 96-page catalog, explains in brief copy and many photos and drawings the wide assortment of styles, modifications and accessories available on mechanical variable-speed Motodrives.

The catalog includes construction features, specifications, speed and rating tables, and pricing information.

Reliance Electric and Engineering Co., Dept. PVP, Reeves Pulley Div., Columbus, Ind.

PIGMENTS

Eight-page guide to the use of natural pearl essence and synthetic pearl pigments, have been issued.

This is believed to be the first comprehensive published data providing specific details on the qualities of natural and synthetic pearl pigments and their characteristics.

Introductory material describing the natural and synthetic pearl pigments and the nature of each is followed by concise discussion of several important factors including the dispersion and orientation of pearl crystals, choice of pigment types, formulations available for various applications, and application procedures. Reference tables designating the properties, characteristics, and uses of the various grades of natural and synthetic pearl pigments available from The Mearl Corporation are also included.

The Mearl Corp., Dept. PVP, 41 East 42nd St., New York 17, N. Y.

BELT CONVEYORS

New, fully-illustrated bulletin describes the newly developed line of "L" series belt conveyors.

Both the inclined and horizontal belt conveyors are shown, as well as the gravity wheel feeder and single noseover with safety release roller. These latter components are just two of many units of accessory equipment described in the bulletin. Advanced design for safety and efficiency is emphasized.

Dimensional diagrams detail bed construction for both slider and roller types as a feature of the full page of complete specifications. Sample total load capacities are indicated, as are sizes, feeds, belt-

ings, connections, controls and accessories.

E. W. Buschman Co., Dept. PVP, Clifton and Spring Grove Avenues, Cincinnati, 32, Ohio.

FATTY ACIDS

Revised edition of *The Chemistry of Fatty Acids* has been prepared. The 32-page booklet describes in detail the preparation, characteristics and application of 30 fatty acids.

Specifications, sources and composition of fatty acids, saturated and unsaturated types and synthesis of fatty acids are also covered.

Another section is devoted to fatty acid reactions, while the third

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major part of the booklet reviews the handling of fatty acids in shipment, storage and in use.

Armour Industrial Chemical Co., Dept. PVP, 110 North Wacker Drive, Chicago 6, Ill.

LABORATORY BALANCES

New 12-page catalog, lists a complete line of analytical laboratory balances. Seven different balances types, including new thermo-recording and micro-chemical balances, are pictured and described in detail. Projection reading, improved weight-loading and ease of access to balance chamber are some of the features stressed. For durability, synthetic sapphire (corundum) planes are fitted to almost all of the balances listed. Complete ordering information includes all variations and options available as well as tables of replacement parts and availability of a complete maintenance service.

Burrell Corp., Dept. PVP, 2223 Fifth Ave., Pittsburgh 19, Pa.

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Advantages of liquefied petroleum gas as a fork truck fuel are discussed in a six-page color brochure.

A comparison is made between the operating characteristics of LP Gas and gasoline, with emphasis on savings possible with LP Gas. Examples of savings from six actual applications are given. Sketches illustrate construction features of factory-installed LP Gas fuel systems.

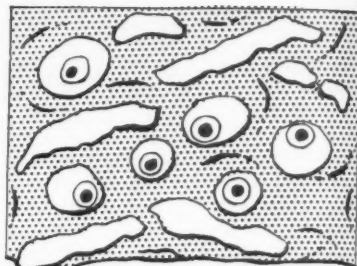
Clark Equipment Co., Industrial Truck Div., Dept. PVP, Battle Creek, Mich.

ABSTRACTED JOURNALS

A listing of abstracted Russian technical journals currently available by subscription from the Office of Technical Services, U. S. Department of Commerce, has just been published.

The listing shows some 100 Soviet technical periodicals abstracted regularly by U. S. Government agencies and released to the public through OTS as part of its program of collection and dissemination of translated technical literature.

The listing, *English Abstracts of Russian Technical Journals*, may be ordered without charge from OTS, U. S. Department of Commerce, Washington 25, D. C.



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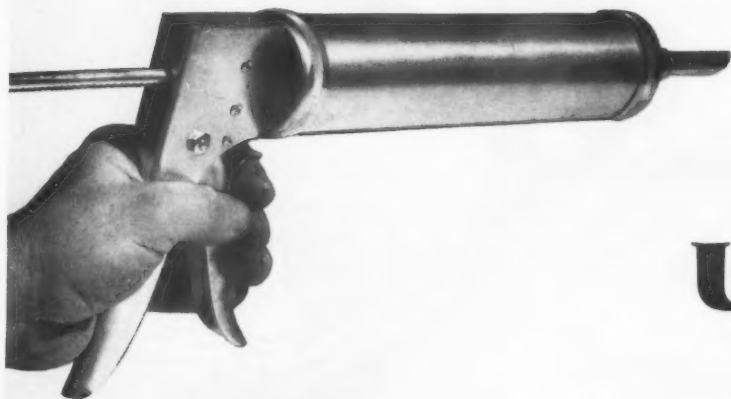


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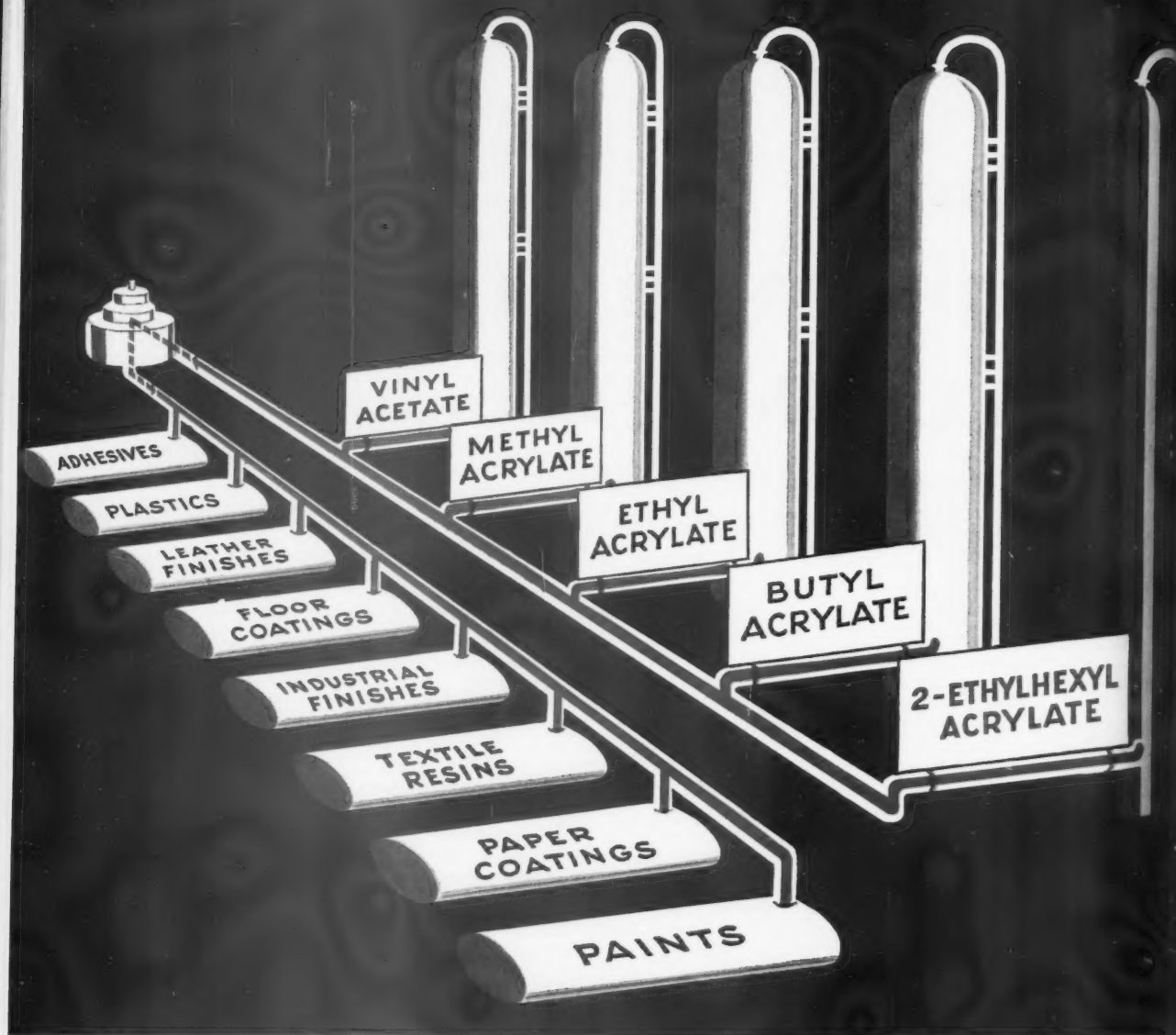
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For more information on Celanese 2-ethylhexyl acrylate, write to: Celanese Chemical Company, a Division of Celanese Corporation of America, Dept. 558-K, 180 Madison Avenue, New York, N. Y.

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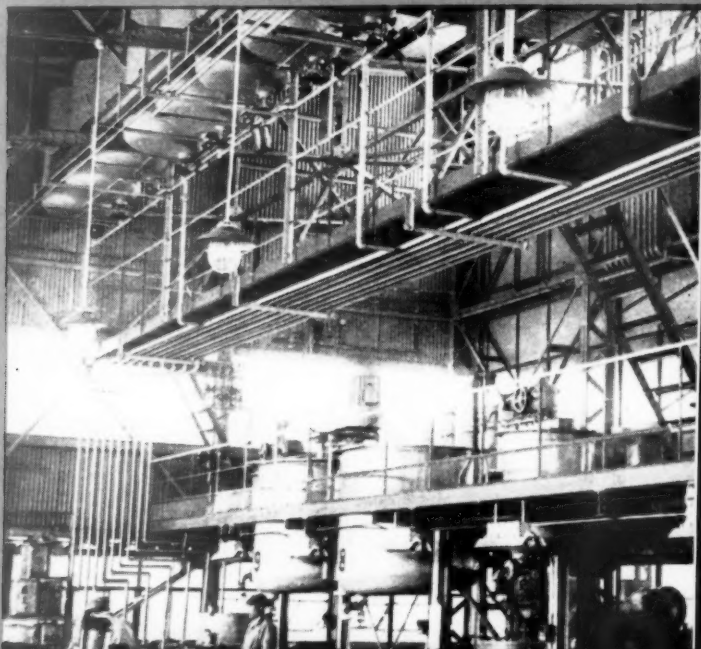
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foreign developments

Soviets Announce
Goals in Paint

Paint Industry
in Japan

This is the mixing department of the Kwansai Paint Company of Japan. Since 1950, the Japanese paint industry has shown remarkable progress and growth. Turn to page 94 for a report on the present status of the paint industry in Japan.



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SOVIETS ANNOUNCE GOALS IN PAINT TECHNOLOGY

ALTHOUGH the volume of paints and varnishes produced in the Soviet Union is second only to the United States, the rate of growth is unsatisfactory as the demand greatly exceeds output. The reasons for this situation are:

1. The gradual decrease in the use of natural raw materials for further processing by the chemical industry has resulted in insufficient supplies of basic products required in the manufacture of paints, lacquers, etc.

2. Insufficient capital investments.

3. Slow expansion of local and cooperative paint and varnish combines which produce over 50% of the volume (the remaining volume comes from those enterprises which operate directly—under the Ministry of Chemical Technology).

As a result of using low-quality raw materials, inferior technology, and narrow assortment of products, the quality of Soviet-made paints and varnishes is below that of foreign-made products. Poor judgment as to quality and quantity of raw materials has been used particularly by local and cooperative enterprises. To increase the production volume and quality of paints and varnishes to a level corresponding to the needs of Soviet economy, it is necessary to:

1. Develop large-scale produc-

Comments on the present status of the Soviet paint industry in the current seven-year period were expounded by B. G. Mirenskii in a recent issue of *Khimicheskaya Nauka i Promyshlennost*.

Mirenskii exhorts the Soviet paint industry to improve its production, both in quantity and quality to meet current demands of construction and industry. To accomplish this task, he said, great emphasis must be placed on the development and construction of synthetic resin facilities, particularly alkyd resins, and also the improvement of paint production techniques and equipment. It is interesting to note that the seven-year plan calls for gigantic increases in production of all paints, enamels, lacquers, primers, etc. For example, under this plan, the output of water emulsion paints must exceed the 1959 volume by 8,000%. While no figures on the present production of latex paints are given in the article, it is quite apparent that the present volume of this particular paint must be extremely small as a boost of 8,000% would indicate.

One striking statement that Mr. Mirenskii makes is that the volume of paints produced in the U.S.S.R. is second only to the United States. Again, since no production figures are given, comparison of this production volume with the United States, Great Britain, or Western European countries is difficult.

tion of synthetic film-forming materials. At the end of the seven-year period, the production volume of synthetic resins is to increase 4.4 times over the 1959 figure. The plan provides for wide development of both thermosetting and thermoplastic resins for manufacturing lacquers; the latter will be produced, for the most part, at the site of monomer production. The following synthetic resins are to receive primary attention: various polyester groups (alkyd, unsaturated polyesters dissolved in monomer and copolymerizing during film-formation); soft polyesters for urethane coatings; alkyd-styrene, alkyd-acrylic copolymer resins; pure and modified phenolics; urea and

melamine-formaldehyde resins; 100% and modified epoxies; ketone resins; various vinyl resins based on vinyl chloride, vinyl acetate, derivatives of acrylic acid, etc.; resins based on acetals; polyamide and organosilicon resins. Mass production of synthetic latices is planned. A variety of products is to be manufactured within each of the mentioned group: for example, alkyds based on application of phthalic anhydride, isophthalic, terephthalic, maleic, adipic, sebacic acids, or various polyols such as glycerine, pentaerithrit, trimethylolmethane, glycols, etc. Among the synthetic resins, alkyds will receive the most attention in the seven-year plan.

2. Develop large-scale production of organic pigments, located at the sites of dye-manufacturing facilities. By 1965, the production of these pigments will have increase 2.5 times as compared with 1959. By far the main emphasis is placed on development of TiO_2 production at the expense of other white pigments.

3. Combine the raw materials into a wide assortment for paint production by creating facilities for such a development. A significant part of the paints and varnishes will be used by the construction industry. Among them are primarily water-emulsion paints based on polyvinyl acetate, acrylic and butadiene-styrene latices. In comparison with the 1959 output volume, the seven-year plan stipulates the following increases:

Lacquers (alkyd, oil, bitumenous), including intermediates and driers.....	123.6%
Enamels and primers on synthetic vehicles	155.0%
Lacquers and enamels and their solvents...	800.0%

Cellulose ester lacquers and enamels and their solvents..... 105.1%
Water-emulsion paints 8,000.0%

The present concentration of the paint and varnish industry will be deployed in the Russian, Ukrainian, Uzbek and Latvian Republics. Ready-made products will be manufactured at centers of heaviest use. The following plants will be built to process semi-finished into finished products: four plants with a capacity of 25,000 ton/year each; 20 plants with a capacity of 10,000 ton/year each; and 15 plants with a capacity of 5,000 ton/year each.

The plan calls for serious effort in the improvement of present technological practices. More attention should be devoted to automating the various processes employed in paint manufacture.

Manufacturers of paint processing equipment are urged to design better mills and dispersion equipment which will help increase production.

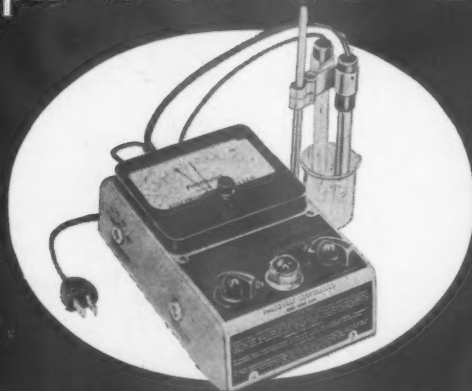
Application methods employing electrostatic and hot spraying should be investigated in order to

obtain economies in paint materials.

In the next seven years a major portion of the technological development will be of primary concern to all scientific and research organizations. Moreover their network will be broadened to fit in with a central research plan. The scientific research institute for paints and varnishes (GIPI-4) will use in 1960 the Krasnopresnensk paint plant for research investigations. Branches of the institute will be established in Leningrad and Chelyavinsk. A new paint and varnish technology institute is now being organized to investigate surface preparation, product application, drying, etc. All present paint and varnish enterprises are to expand their laboratory facilities.

In comparison with the last seven-year period, the new plan for 1959-1965 calls for an eight-fold increase of capital investment in the paint and lacquer industry. In addition to the planning bureaus in Moscow and Leningrad, a new planning and project bureau (a branch of GIPI-4) is to be erected in Yaroslavl.

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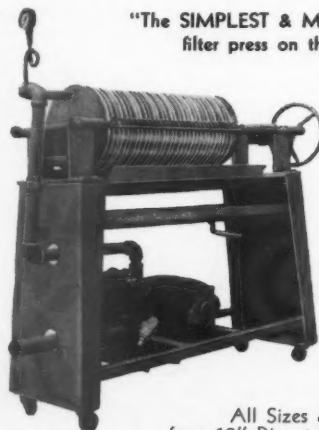
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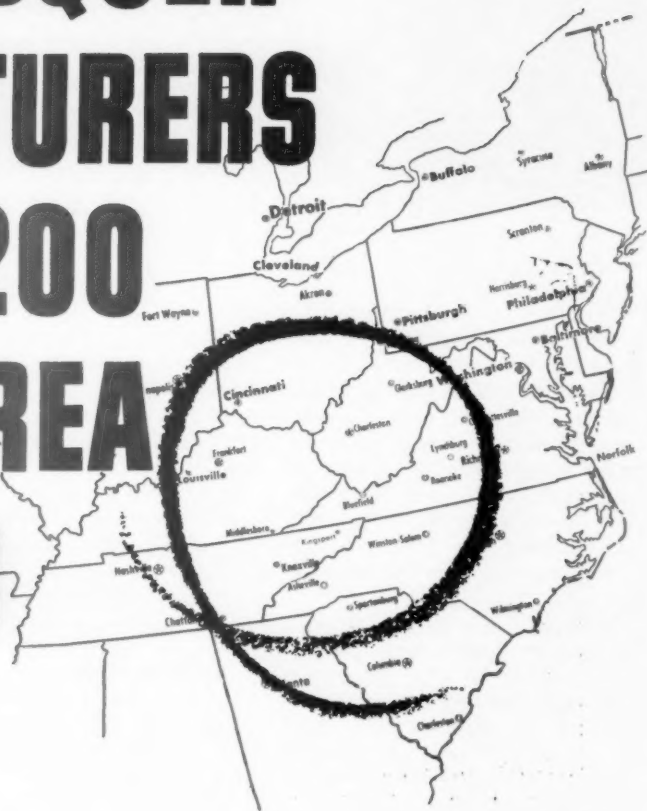
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Cutting nitrocellulose at Kwansai Paint Co.

THE PAINT INDUSTRY IN

IT took five years after the close of World War II for Japan to begin rebuilding its paint industry. In the year of 1950, Japan was able to import such basic raw materials as linseed oil, soybean oil, copal gum, shellac and dammar. With these materials, Japan realized a production of some 85,000 tons of paint products for the year of 1950.

Since 1950, the Japanese paint industry, spurred by the demand of paints and finishes for new buildings, ships, railroad equipment and facilities, furniture, automobiles, etc., showed remarkable progress. This is attested to the fact that the production index of paints was larger than that of mining and many other industries.

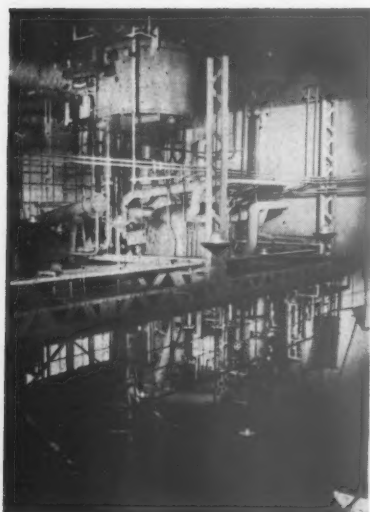
The past eight years have seen an annual increase in paint production from 85,000 tons in 1950 to 228,000 in 1958. During that period, oil paints, varnishes, enamels, nitro cellulose lacquers, synthetic resin lacquers and other lacquer products and thinners were produced. Oil paints have gradually decreased whereas lacquers and synthetics showed a healthy increase.

Synthetic Resins

The development of lacquers and industrial finishes depended in a large measure on the capability of the Japanese chemical to produce synthetic resins. It was not until 1948 that urea-formaldehyde was first produced in Japan. This resin

was alcohol soluble and found use in the manufacture of fast drying lacquers for wood furniture and certain primers.

Since the introduction of this urea-formaldehyde resin, an array of new synthetic resin followed. Among these were vinyls of all types, silicones, epoxies, styrene-butadiene copolymers, p-tertiary butyl phenolic resin, and butyl titanates. In recent years unsaturated polyesters have found widespread use in finishing furniture and television cabinets. Polyurethanes are now being investigated with the expectation they will be used commercially within the next two years. Last year finishes based on melamine formaldehyde



Synthetic resin plant at Kwansai Paint Co.

Electron microscope is used for specialized studies and analysis.



JAPAN



Technical center of Kwansai Paint Co.

resin were first made available in Japan by Nippon Yushi Co., Ltd.

Drying Oils

Conventional house paints produced in Japan took about 20 hours to dry. In the interest of speeding up the drying of these oil based paints, oil modified materials such as styrenated oils and alkyds and vinyltoluene-modified oils were introduced.

Emulsions and Specialties

In 1958 the production of water emulsion paints reached 5,000 tons and estimates are that 1959 will show a volume of 10,000 tons. Latices employed include styrene-butadiene, polyvinyl acetate copolymers, straight acrylics, and

vinyl acetate acrylic copolymers. Alkyd emulsions are also available in Japan.

An interesting product is a paint developed by Kawakami Toryo Co., Ltd., called "Eyglo." This product is used to detect flaws on metal surfaces by means of a fluorescence glow. First the metal surface is painted with a penetrant of "Eyglo" and then washed with water. After drying, the surface is treated with the developer "Eyglo." An ultraviolet ray (3650 angstrom units) applied to the surface will result in the emission of light yellowish or green colored fluorescence in those areas where surface defects are present.

Some years ago Kwansai Paint

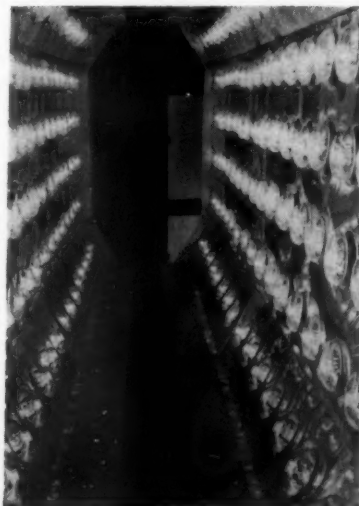
Co. Ltd. produced a multicolor lacquer similar to such products manufactured in the United States. A similar development was made by Tao Paint Co. which devised a special spray gun capable of producing a multicolor pattern with lacquers, enamels, oil paints, etc.

Production

The techniques used in the manufacture of paints are similar to those employed in the United States. Ball mills, roller mills are used extensively in grinding operations, but more recently, high speed equipment have attracted considerable attention in the processing of latex paints, lacquers and enamels.



Electrostatic painting apparatus.



Paint laboratory is equipped with infrared drying oven.

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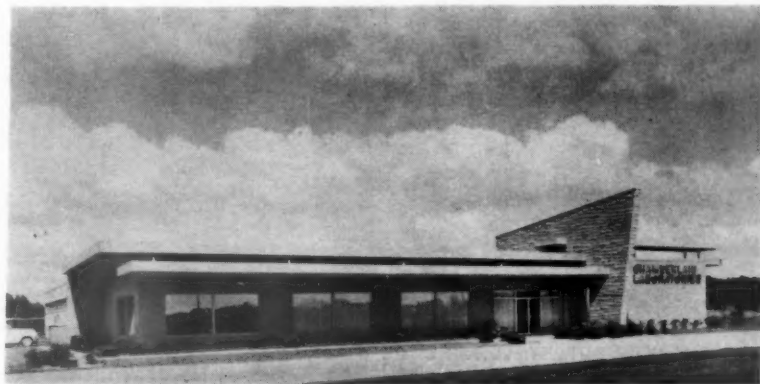
Chamberlain Laboratories, the new research and development center of The U. S. Stoneware Co., was formally dedicated as a feature of U. S. Stoneware's Centennial celebration.

Ceremonies marking the event included an "open house" at Chamberlain Laboratories, which gave visiting representatives of science, industry and the press an opportunity to inspect the new facilities, followed by a dinner in nearby Akron, Ohio. Principal speaker of the evening was Dr. Foster Dee Snell, President of Foster D. Snell, Inc., who spoke of *Research Over Nearly Four Decades*. Short talks were also given by Dr. Walter J. Murphy, editorial director of the various American Chemical Society publications, and Dr. Paul Bachman, vice president and director of research of Koppers Company, Inc.

Organized and equipped to meet the specific needs of The U. S. Stoneware Company, Chamberlain Laboratories is perhaps best characterized by its theme *Mobility-Adaptability-Versatility*, a theme that is reflected not only in its physical construction, but also in its work with U. S. Stoneware.

Working principally in the fields of plastics, rubber, adhesives and protective coatings, the laboratory's duties and responsibilities extend into several different areas, such as product research and development, manufacturing techniques, standards, quality control and customer assistance.

U. S. STONEWARE DEDICATES NEW DEVELOPMENT CENTER



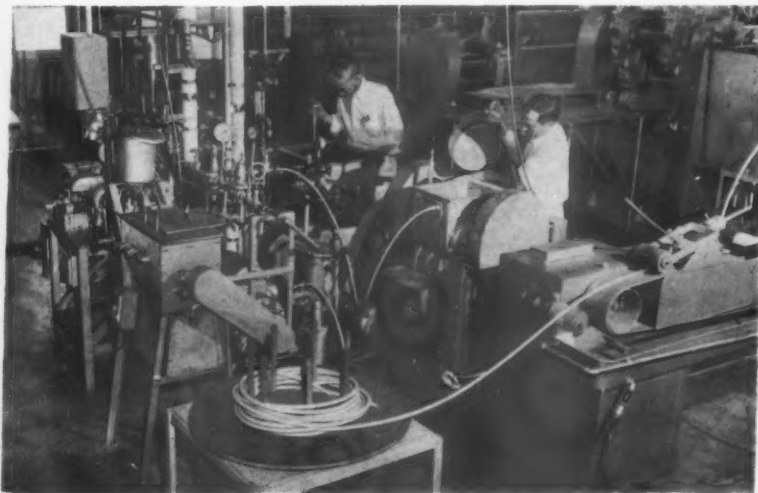
Chamberlain Laboratories, Stow, Ohio.

Reflecting the theme *Mobility-Adaptability-Versatility*, too, is the design of the building itself. When requirements change, either permanently or temporarily, interior working space can be reapportioned easily and quickly. Relocation of equipment is facilitated by having all service lines (water, gas, electricity, compressed air, high and low pressure steam, de-ionized water and vacuum) and all service ducts (exhaust and heating) running overhead from front to rear in each of the three bays.

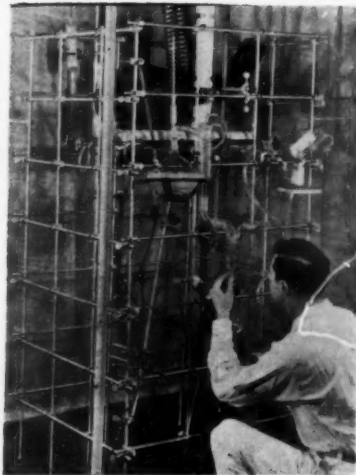
Implementing the theme of flexibility, again, is Chamberlain Laboratories' equipment and apparatus.

More complete and up-to-date than that found in many laboratories vastly larger in size, it enables Chamberlain scientists and technicians to deal with an extremely wide range of problems. In addition, with five major universities situated within easy reach, Chamberlain Laboratories' location affords outstanding opportunities for mutual assistance programs with the technical departments of these universities.

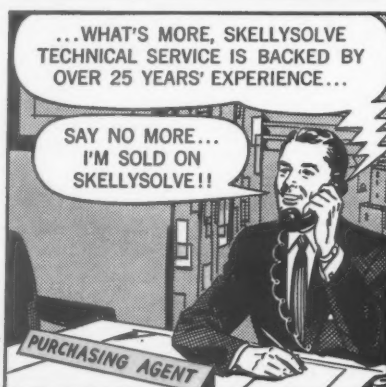
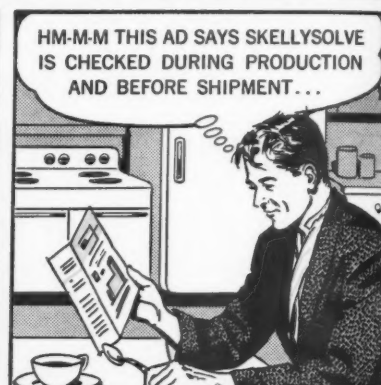
The U. S. Stoneware Co., founded in 1859, is a major producer of corrosion-resistant equipment and supplies.



Small mixers and extruders used in pilot plant operations to perfect manufacturing techniques for new products.



Floor-mounted rack supports this assembly of apparatus used in organic reactions.



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NPVLA HOLDS 72nd MEETING in ATLANTIC CITY

**Pres. Battley predicts
2-billion dollar volume for 1960**

Annual sales volume for the paint, varnish and lacquer industry in 1960 will surpass the \$2 Billion mark for the first time in history, President Joseph F. Battley predicted as he addressed the opening session of the 72nd Annual Meeting of the National Paint, Varnish and Lacquer Association at Haddon Hall Hotel.

"Back in 1947, when I first joined the staff of the Association, the paint industry was trying to hit the \$1 Billion mark in annual sales for the first time," General Battley said. "This year we will have sales of over \$1.75 Billion—a new record. Next year we will 'Sell More Paint' and soar over the \$2 Billion level," he said.

General Battley said that the American public was never more paint conscious than it is today. "Not only paint conscious," he said, "but paint-wise, thanks to our national publicity program and now with our new 'Hidden Power' sales training courses. There has been a

tremendous growth in the amount of technical information on our new products furnished to trade and consumer publications, students and educators, civic and social clubs, and business and trade groups. These, plus increased showings of our industry films, have whetted consumer appetites and ripened interest into sales," he added.

The industry's sales volume is becoming more and more dependent upon the hidden power of color, General Battley stated. Because of this, he said:

"We have developed many new and unique color promotion ideas and merchandising materials. A new series of color booklets, designed to further educate the consumer on the advisability of using paint colors in home and institutional decor, will be published in the new year," he said.

"What you know as 'competitive surfaces' have also grown and take a good cut into certain of our traditional markets," he pointed out. "These competitive products have blossomed in the past few years through more and more hard selling on their producers' part. We cannot afford to rest on our laurels, nor mark time. We must sell our own products harder and better than we've ever sold them. We must SELL MORE PAINT!"

Senator Jacob K. Javits, in the keynote address, urged a \$10 billion a year program of public and private investment by the United States and its friends in the less developed nations.

Senator Javits proposed that the NATO Council be asked to appoint a commission to establish the basis for partnerships between the United States and other members for aid to the less developed areas.



Joseph F. Battley

Cherne Reports Outcome of Research Institute Poll

Leo Cherne, Executive Director of The Research Institute of America told members of the paint industry gathered at the 72nd Annual Meeting of the National Paint, Varnish and Lacquer Association that Khrushchev's visit to the United States had not changed the minds of American businessmen.

A survey conducted by the Research Institute of America revealed little change in the opinions of businessmen before and after Khrushchev's visit. seventy-nine% felt there should not be more trade with Russia before the visit and 78 per cent felt the same way after the visit. Hopes for peace were likewise unchanged, 58 per cent saying there was no change in their hopes.

Mr. Cherne listed eight objectives of Khrushchev.

1. A division of the Western Nations,
2. a weakening and destruction of NATO,
3. recognition that captive European States are within the Soviet orbit,
4. a permanently communist East Germany,
5. a relaxed America,
6. a West Germany separated from Europe and impelled to bargain with USSR,
7. continuance of the British policy to await a weakened and divided Europe for commercial purposes,
8. respect for the Kremlin before the underdeveloped, uncommitted world in Asia, Africa, the Middle East and Latin America.

He said Russia is closer to these objectives than it was 90 days ago.

The steel strike injunction will not settle anything according to Mr. Cherne. Pressures are being put on both parties for a compromise. It is his opinion that if the strike is resumed after Christmas it will not long continue.

Mr. Cherne predicted that the total national output would be almost 40%, higher at the close of the current decade than when it started. The paint industry is expected to do even better. The increase in productivity will rise sharply in the early 60's, level off a bit around 1963 or 1964 and then continue upward.

3000 ATTEND FEDERATION MEETING and PAINT SHOW

Exhibits featuring water systems highlight 24th show.

THE 37th annual meeting of the Federation of Paint and Varnish Production Clubs and the 24th Paint Industries' Show held October 20-24th attracted some 3,000 paint technologists from the United States and Canada. As in previous meetings, the technical program featured several interesting panel discussions, the Joseph J. Mattiello Memorial Lecture by Vincent C. Vesce; an interesting address by Herbert B. Woodman; and an array of Production Club and Roon Award papers.

Keynoting this year's Federation meeting was Herbert B. Woodman, president of Interchemical Corp. In his address, entitled "What's Past Is Prologue," Mr. Woodman took note of the increasing effort of the Soviets to overtake us economically. Describing the system used by the Soviets to educate and train more engineers and technicians, he pointed out that the free world, particularly the United States, has a real challenge to keep ahead of the Soviet Union. He said:-

"Recent Soviet progress points to the necessity—and opportunity—of establishing within the framework of our free society an era of creativity and productivity that will surpass anything we have done in the past. One of the key factors in establishing this new era is an improved relationship between managers, on the one hand, and technical people on the other."

Mr. Woodman urged industrial managers to consider the needs and desires of scientists for a statement of the objectives of management, for adequate financial recognition, for more freedom and recognition by their peers. On the other hand scientists must recognize the responsibilities of management and the facts of industrial life.

Mattiello Lecture

The 1959 Joseph J. Mattiello Lecture was delivered by Vincent C. Vesce, technical director for Harmon Colors, National Aniline Division, Allied Chemical Corp. The subject of his lecture was "Exposure Studies of Organic Pigments in Paint Systems."

Mr. Vesce said organic pigments are necessary to the paint industry because of their tinctorial strength and depth of shade. He emphasized that light fastness and stability are also important properties. To



Pres. Raymond C. Adams

obtain more data on light fastness, Mr. Vesce described exposure results of several organic pigments in five paint systems. The five vehicles included air dry alkyd enamel, baking enamel, nitrocellulose lacquer, acrylic lacquer, and acrylic emulsion.

After exposure of 3 months, those panels which failed were removed, together with all other panels in that category; after 6 months, further failures were removed; and after 9 months the final results were evaluated. Final tabulation revealed that 40% failed

after three months, 20% after 6 months, and 40% failed after 9 months.

The failures were then categorized into four different groups: (1) Those which showed good color fastness after 9 months, in all vehicles and in all dilutions such as phthalocyanine blue in nitrocellulose lacquer; (2) those which failed in all categories, such as the AZO types, including ordinary lithol reds; (3) those which varied with the vehicle, such as a new special litho red; and (4) those which varied with the degree of dilution, such as hansa yellow, which lasted 9 months when pure, but in the pastel form lasted only 3 months.

Mr. Vesce pointed out that the cause of fading is not exactly known; it may be due to chemical change or to oxidation. Since organic pigments are subject to both physical and chemical change, the introduction of any new ingredient or new vehicle should be investigated. Fading in mixtures is due to three types of behavior: the weakest pigment in the mixture determines the fading quality; the amount of pigment present; and chemical behavior.

Pres. J. F. Battley

Joseph F. Battley, president of the National Paint, Varnish and Lacquer Association remarked that it was "with a true sense of pride" that he address the Federation after so many long years of separation, and he was indeed pleased that both the Federation and Association have recognized the wisdom of again holding joint annual meetings.

He paid tribute to the paint chemists for their work in developing paint formulations for most of the products we are selling today which were unknown three or four years ago.

Citing the role protective coatings play in the space program, president Battley pointed out that specialized coatings are being used on missiles and satellites for such purposes as the regulation of temperatures, to seal components against moisture and other damage and to insure accurate identification of the countless parts, pipes and wire systems.

Roon Award and Club Papers

"*Efflorescence and chalking on Painted Masonry Surfaces*"—G. Al-

lyn (Roon Award Competition).

Extensive field surveys and exposure tests have isolated many factors contributing to efflorescence and early chalking in emulsion paint films on masonry surfaces.

There are a great many sources of efflorescing salts on masonry structure including cement itself, cement paints applied to the surfaces, ocean spray and water absorbed from the ground.

These salts may be deposited on paint films to cause efflorescence. Furthermore they may attack paints either during application or later in the life of the paint film to give premature chalking.

For best resistance to efflorescence and early chalking, it is essential to use binders and pigments with maximum resistance to alkali, moisture, heat, and ultra-violet light. It is also essential that maximum stability be provided both for the pigment dispersion and for the emulsion vehicle to resist coagulation by soluble salts during application of the paint to masonry surfaces.

Application conditions also affect chalk resistance of films. It is essential that enough paint be applied or early failures may be experienced. Test methods for early chalking and efflorescence have been devised and are giving good correlation with field experience.

"Prediction of the Critical Pigment Volume Concentration of Multi-component Pigment Mixtures"—Philadelphia Club.

The Philadelphia Club has investigated the possibility of calculating the CPVC of pigment mixtures from information about the constituent pigments. A correlation method has been used on spatula rub-up data. Oil absorptions were obtained for ten pigments and all possible two component mixtures. It was shown that these data on binaries can be used to predict satisfactorily the values for mixtures of more than two pigments.

The data were used further, along with electron photomicrographs, to study the effect of composition on packing. This study led to a characteristic oil contribution for each pigment in any mixture in which it occurred. The value can easily be used in a mixture calculation to give predictions which are almost as good as the ones above, despite the fact that some information is thereby ignored. This new method can readily be expanded, while the binary method cannot, to include pigments not yet investigated.

"Influence of Cold Rolled Steel Surfaces on Paint Performance and Paint Testing"—G. W. Grossman, Jr. (Roon Award Competition).

The purpose of this paper is to show how steel surfaces influence paint performance, how steel quality could be improved, and how standard steel test panels for paint can be manufactured.

Several years ago, research at General Motors proved that surface contamination on steel was very harmful and caused early failure of paint systems. However, the identity of the contaminant was not determined.

Tests to learn what the contaminant was were based on a thesis that phosphate coatings formed under the contaminant layer and that removing some of the zinc phosphate would remove the contaminant. These tests were only partially successful

but they indicated the carbon was the contaminant.

Metallurgical analysis of steel surfaces provided two proofs that the trouble was carbon and examination of steel-making procedures indicates that the breakdown of oils on the surface during annealing is the most likely source of carbon contamination.

New Officers

Raymond C. Adams of Gilman Paint & Varnish Company, Chattanooga, Tenn. was installed as president of the Federation; Eugene H. Ott of Ferbert-Schorndorfer Company of Cleveland was named president-elect; William L. Foy of Foy Paint Co., Cincinnati was elected treasurer. C. Homer Flynn remains executive secretary.

Next year's annual meeting will be held in Chicago, October 30-31, Nov. 1-2, 1960.

Paint Show

Highlighting this year's show were the many manufacturers exhibiting the merits of water systems for both trade sales and industrial applications. Thirty-four exhibitors featured materials of interest to manufacturers of water-based paints. These materials covered a broad range of latex emulsions, water soluble resins, emulsifiers, driers, additives, and water dispersible pigments and extenders.

Here is a rundown of paint raw materials exhibited for the first time.

Intermediates

Polyether acids of diphenolic acid for improving the properties of synthetic resins; diphenolic acid for preparing a water solution coating system; cyclohexene oxide derivatives for synthesizing drying oil varnishes; pentaerythritol-formaldehyde technique for synthesizing alkyds.

Synthetic Resins

Water soluble chemically modified vegetable oil vehicle for industrial metal baking primers; unsaturated wax-free type polyester resins for formulating clear or pigmented coatings; styrene-butadiene copolymers (thermosetting type) of low molecular weight resins with high unsaturation; epoxy resin for one coat appliance enamels; epoxy resin for use in bitumen coating; epoxy resin for flooring compounds; polyamide resin for imparting "built-in" thixotropic body

to solvent or oil based coatings; pure oxidizing oil modified alkyd which sets tack free in 5 minutes; silicone-alkyd; water white styrene copolymers; and a hydrocarbon resin for caulks and sealants.

Emulsions

Vinyl-acrylic emulsion that is compatible with both zinc oxide and leaded-zinc oxide pigment; vinyl acrylic copolymer emulsion for imparting resiliency and toughness allowing for better washability and durability; copolymer emulsion for exterior application; cross-linking emulsion for metal primers; micro particle vinyl acetate copolymer with improved water resistance, binding power and freeze thaw resistance; acrylic emulsion which provides good flow and leveling properties.

Solvents

New uses of ketone solvents in coatings; expanded application of nitroparaffins in various solution coatings; deodorized water white petroleum solvent for use in brushing enamels, and special solvents for polyurethane coatings.

Driers and Additives

Water dispersed driers for use in water thinned paints and completely compatible with all latexes; non-ionic polyester plasticizer surfactant for PVAc and styrene-butadiene emulsion systems; phenyl mercury acetate to give resistance to putrefaction and resistance to mildew on the dried film; anti-foaming agent for latex paints; phenylmercuric propionate (a bactericide-fungicide) packaged in a new water soluble package for insuring greater safety and ease of handling.

Pigments and Extenders

Two yellows, royal maroon, aurelian bronze available in dry pigment, press cake, and dispersion forms; ming oranges in medium, dark and extra red shade; universal tinting vehicle for all common commercial pigment colors, both organic and inorganic; gold bronze powders; aluminum paste; ultra fine magnesium silicate with controlled particle size distribution.

Equipment

Variable speed dissolvers; attritor fine grinding machines; high speed mixer; automatic variable speed paint disperser; heavy duty, high speed disperser; and automatic can and package coder.

NEWS

Recommends Beneficiation For Several Industries

Beneficiation, a time-honored method for separating minerals from less valuable components of the earth, could be equally useful in many industries far removed from the production of minerals, said Adam L. Wesner, a specialist in beneficiation research at Battelle Memorial Institute, Columbus, Ohio.

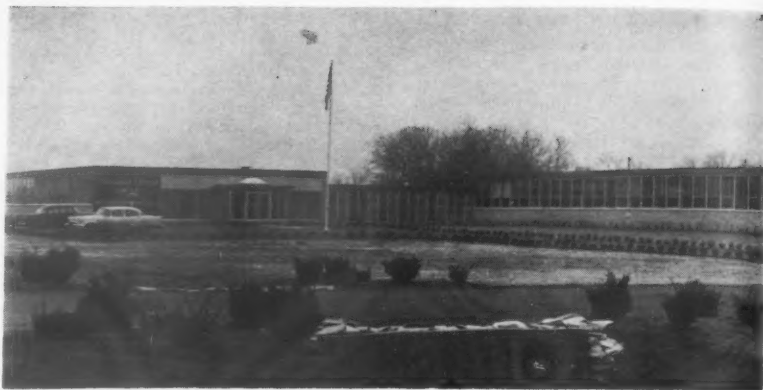
"The techniques of beneficiation," he said "are being used more and more to solve a host of industrial problems. Many of these problems apparently have no relation to those encountered in the concentration of ores, but the basic principles are similar. If the possibilities of the application were only recognized, however, they could be beneficial in many new areas where they are not now applied," he said.

Mr. Wesner suggests that technical men in non-mineral industries make a critical examination of their raw materials, intermediate products, final products, and all waste products in the search for ways to profitably employ beneficiation techniques to separate materials.

Colton Expands Plant

Colton Chemical Company, a division of Air Reduction Company, Inc., is expanding production and storage facilities at Elkton, Md. A new multi-million pound ester plant, warehouse, and bulk storage tanks are being added to Colton's installation at Elkton.

Scheduled for completion in late 1959, the cost of the project will be close to \$300,000. This expansion follows increases in emulsion production facilities at Colton Chemical plants in Elkton and Cleveland, Ohio, completed during the past year. Additional capacity has been necessary as a result of widening use of polyvinyl acetate and copolymer resin emulsions in the paint, paper, and adhesive industries.



RESEARCH CENTER: The Columbian Carbon Co. has announced the opening of the Carbon Black and Pigment Division's Research Center at Princeton, N. J. The new headquarters will be devoted to all phases of research and development of carbon black, pigments, and related fields.

Van Wirt Elected President

The Imperial Color Chemical & Paper Corp., announces the election of Alfred E. Van Wirt as executive vice president. Mr. Van Wirt is currently vice president and technical director.

Mr. Van Wirt is a native of Glens Falls, major location of the Imperial Corp. He attended Cornell University, graduating in 1923. After graduation, he was employed by the Allied Chemical Corp., in Philadelphia from 1923 to 1925. In the latter year, he returned to Glens Falls as a production staff assistant with Imperial. In 1930, he was assigned to administrative responsibilities in the Wallpaper Division. During his years in the Wallpaper Division, Mr. Van Wirt developed a number of "firsts" in the wallpaper industry. Among these achievements was the introduction of light-fast and washable wallpapers.

National Can to Expand

National Can Corp. announced that it will build a 60,000 square foot manufacturing plant at Yakima, Washington.

Production capacity will be 100 million cans annually. During peak production the plant will employ 50 persons.

The company will attempt November production during the fall apple canning season. The facility, National Can's second in the Pacific Northwest, will be built along the Northern Pacific Railroad on a 10-acre site which includes room for expansion.

New Carbide Office

A new sales office in Dallas, Texas, has been established by Union Carbide Plastics Company, Division of Union Carbide Corp. It is located in the Fidelity Union Life Building.

James Gibbons, technical representative, will handle the sale of all plastic products marketed by Union Carbide Plastics Company. These include polyethylene, phenolic, vinyl, styrene, and epoxy resins and compounds.

Vickers Petroleum Co. To Open New Office

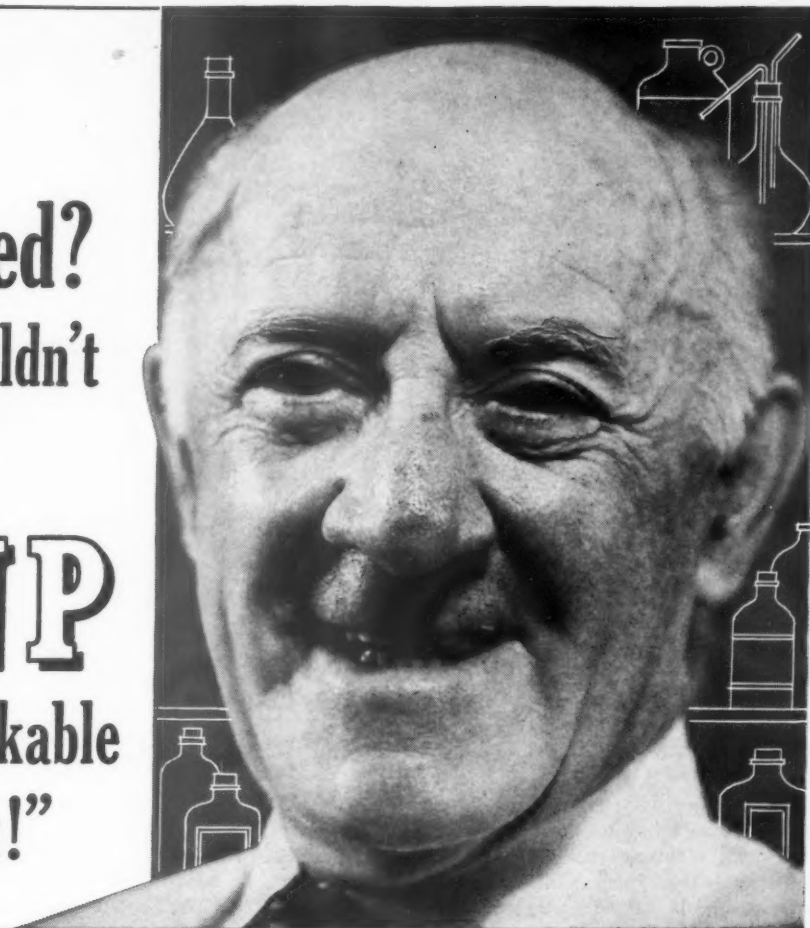
A new district production office of The Vickers Petroleum Co., Inc., will soon be opened in Perryton, Texas, according to A. E. Collins, production manager of the 41 year old Kansas independent firm. The new Vickers district production office will be supervised by Walter Kilgo.

Formerly assistant to the division petroleum engineer, Standard Oil Co. of Texas, Mr. Kilgo will be charged with the duties of district production superintendent for Oklahoma, Texas and New Mexico, said Mr. Collins.

A graduate of Texas A&M with a B. S. degree in petroleum engineering, Mr. Kilgo's experience covers a wide range of drilling and production experience during his tenure with Standard Oil Co. of Texas. Following the organization of Vickers newest district production office, he will make his home in Perryton.

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NEWS

Continental to Expand

Continental Can Company will build a 250,000 square foot can plant and warehouse in Shoreham, Michigan, a suburb of St. Joseph, Reuben L. Perin, executive vice president of the Metal Division, announced.

It will be initially equipped to produce 250 million cans a year on a two-shift basis, with a working force of approximately 90. The plant has been designed, however, for expansion to nearly double this capacity, with addition also of lacquer coating and end fabricating equipment.

Hussey Celebrates Anniversary

Twenty-five years of continuous service with The Goodyear Tire & Rubber Co., were celebrated recently by John M. Hussey, district manager for the Goodyear Chemical Div., at Boston.

During a dinner party attended by friends and business associates in Boston, Hussey received a 25-year pin from H. R. Thies, general manager of the division. A number of other gifts appropriate to the occasion also were presented to Mr. and Mrs. Hussey.

American Can Co. Installs New Coil Processing Center

The ninth unit in American Can Company's national network of coil processing centers is being installed in its Halethorpe, Md. plant, Robert B. Thompson, vice president in charge of manufacturing for the company's Canco division, reported today.

The new Baltimore area center will produce can making sheets from coils of tin plate and is scheduled for operation by December 1, he said. It will supply scrolled sheets, which are used to fabricate ends for metal containers, to seven Canco plants on the Eastern seaboard.

The Halethorpe plant was opened in 1950 and is a major supplier of paper milk containers to dairies in the Washington-Baltimore area, Mr. Thompson said. These operations will not be affected by the addition of the coil processing equipment.

Tamele Retires

Dr. M. W. Tamele retired from Shell Development Company after more than thirty years of outstanding service at the firm's Emeryville Research Center. Dr. Tamele was research consultant on the staff of the Vice President-Research where he served as a general consultant in the fields of colloid chemistry and catalysis.

Emery Announces Expansion Plans

A \$6,000,000 plant expansion project has been announced by Emery Industries, Inc. New construction at the firm's Cincinnati plant will increase several fold the existing capacity for production of azelaic and pelargonic acids from oleic acid by ozone oxidation.

The present plant, completed five years ago, is the world's only installation for commercial oxidation by ozonolysis.

John J. Emery, President, said the expansion move results from a substantial broadening of the utility of azelaic and pelargonic acids and their derivatives.

This expansion program includes also plans to increase several fold esterification capacity for Emery's line of Plastolein Plasticizers, and Emolein diesters for jet engine lubricants.

The new installation will utilize the same basic process as the existing plant, but will take advantage of numerous modifications which have been developed and installed in the existing plant to bring it to maximum efficiency, safety, and dependability.

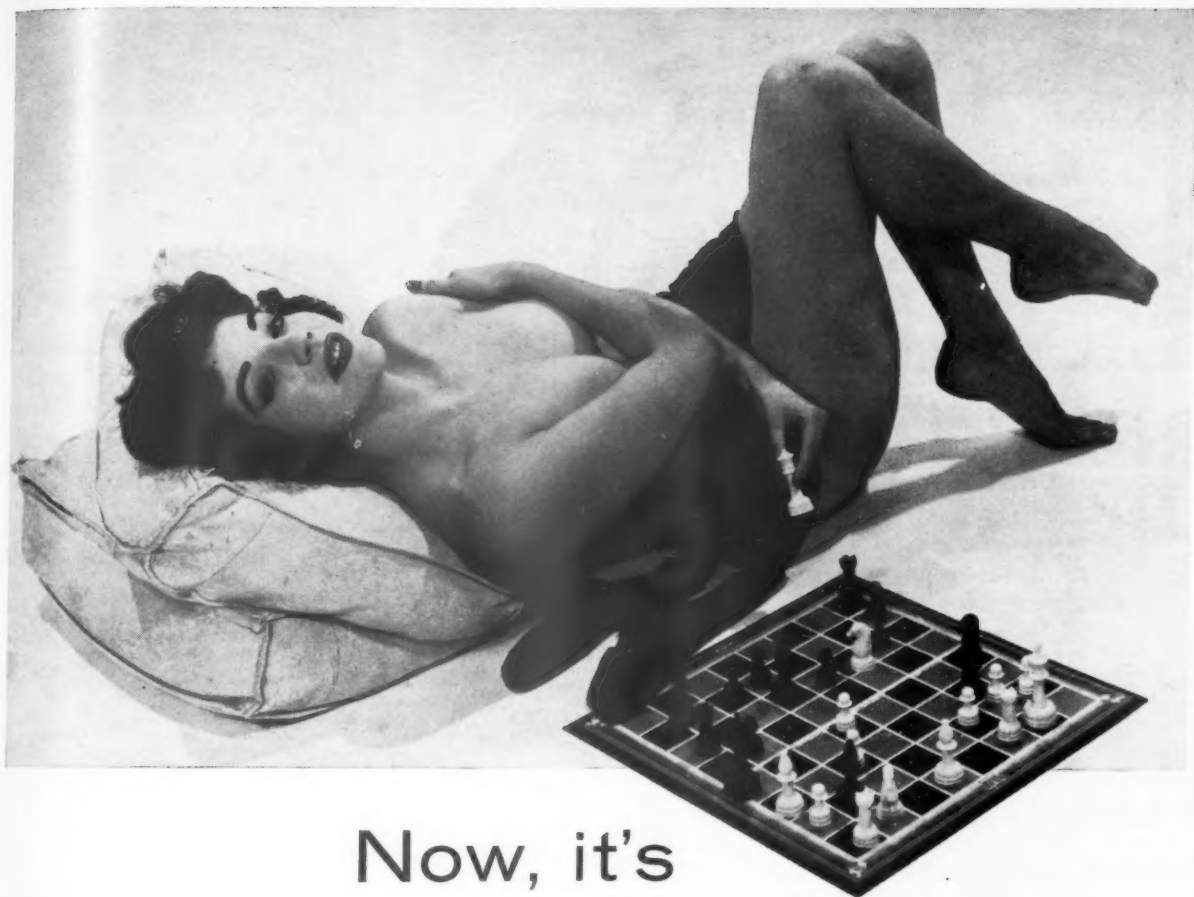
New License Agreement

A cross-license agreement under United States patent rights of each company in the field of polycarbonate polymers has been executed by General Electric Company with Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany, according to an announcement by Dr. A. E. Schubert, General Manager of General Electric's Chemical Materials Department, at Pittsfield, Mass.

Polycarbonates were developed independently by the two companies—in the United States by General Electric Company, and in Germany by Bayer. The materials represent an entirely new class of polymers which exhibit high impact strength, excellent dimensional stability, superior heat resistance, and good electrical properties. Discovery in the General Electric Research Laboratory stemmed from a program of basic polymer research seeking better high temperature organic materials for insulation and structural applications.



SERVICE PIN AWARD: A colorful 45 years in the field of research was observed this past week by Dr. R. P. Dinsmore, vice president of research and development for The Goodyear Tire & Rubber Company. He is shown here, center, receiving his 45-year service pin and congratulations from Board Chairman E. J. Thomas, left, and Goodyear President R. DeYoung during a meeting of the company's board of directors.



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DETERMINATION OF ROSIN

(From page 37)

Average values calculated by the Herrlinger-Compeau equation and the BMI modification are in Table 6.

Table 6—Rosin Acids, Per Cent—BMI Data

Sample No.	Present	H.-C.	BMI
9905-2	0	0.02	0.08
9905-2-D	0.50	0.18	0.26
9905-4	0.60	0.64	0.77
9905-6	5.3	4.8	5.3

Table 6. Average values calculated by Herrlinger-Compeau equation and the BMI modification.

The recommended procedure, which is given in detail in Appendix B, consists of the following steps:

1. Saponification in a diethylene-glycol-KOH solution containing phenetole to control boiling temperatures.
2. Extraction of the unsaps with benzene.
3. Liberation of the rosin and fatty acids by acidification with sulfuric acid.
4. Recovery of rosin and fatty acids by benzene extraction.
5. Determination of rosin acids by the Herrlinger-Compeau method.

Further work will be needed to determine whether the method is satisfactory with other types of vehicles such as those containing maleic anhydride and phenolics.

Part II will appear in the December issue and will cover experimental details and the Tentative Method of Test for Total Rosin Acids Content of Coating Vehicles.

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) showing the Ownership, Management, and Circulation of PAINT AND VARNISH PRODUCTION, published monthly at Easton, Pa., for October 1, 1959.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: John Powell, 855 Avenue of the Americas, New York 1, N. Y.
Editor: Anthony Errico, 855 Avenue of the Americas, New York 1, N. Y.
Managing editor: None
Business manager: Alan P. Danforth, 855 Avenue of the Americas, New York 1, N. Y.

2. The owner is (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.) Powell Magazines, Inc., 855 Avenue of the Americas, New York 1, N. Y.

John Powell, 855 Avenue of the Americas, New York 1, N. Y.
Ira P. MacNair, 254 W. 31st Street, New York 1, N. Y.
Alice L. Lynch, 855 Avenue of the Americas, New York 1, N. Y.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number or copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only).

JOHN POWELL, publisher

Sworn to and subscribed before me this 14th day of September, 1959

(SEAL)

Daniel D. Randall
Notary Public, State of New York
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CALENDAR

Nov. 21-24. 12th Annual Convention and Trade Show of the Retail Paint and Wallpaper Distributors of America, Conrad Hilton Hotel, Chicago, Ill.

Nov. 30-Dec. 4. 1959 Exposition of Chemical Industry, Coliseum, New York City.

Dec. 7-9. 46th Annual Meeting, Chemical Specialties Manufacturers Assn. Mayflower Hotel, Washington, D. C.

PRODUCTION CLUB MEETINGS

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.

Cincinnati — Oct., Dec., Mar., May, Hotel Alms.

Dayton — Nov., Feb., April, Suttmilers.

Columbus — Jan., June, Sept., Fort Hayes Hotel.

Cleveland, 3rd Friday, Cleveland Engineering & Scientific Center.

Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, 3rd Monday, Sabella's Restaurant, San Francisco.

Houston, Monday prior 2nd Tuesday, Rams Club.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.

Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Monday, Republican Club, Denver, Colo.

St. Louis, 3rd Tuesday, Kings-Way Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday, 40-S Club, Buffalo.

PERSONNEL CHANGES

CELANESE

Appointment of four new vice presidents, has been announced.

They are: **Henry K. Dice**, vice president-technical director; **David D. Hecht**, vice president-product development; **Robert H. Kampschulte**, vice president-sales, and **Ernest T. Lindsey**, vice president-manufacturing.

Mr. Hecht and Mr. Kampschulte will continue to serve in the company's New York headquarters. Mr. Lindsey will remain at the firm's manufacturing headquarters in Corpus Christi, Tex., and Mr. Dice will continue at the chemical research laboratories in Clarkwood, Tex.

Mr. Dice joined the firm in 1934 and, since 1946, had been manager of chemical research and development. Previously, he had served as a design engineer and pilot plant and process design engineer at the fiber plant in Cumberland, Md.; as chief process design engineer in Corpus Christi, and as production superintendent at the company's chemical plant in Bishop, Tex. He is a 1932 graduate of the University of Pittsburgh, with a chemical engineering degree, and also had attended Antioch College and Ohio Northern University.

Mr. Hecht had been manager of the chemical product development since 1954. A 1940 Rutgers University graduate with a B. S. degree in organic chemistry, he worked for a year following graduation as a chemist for Interchemical Corp. He joined the firm in 1942, worked for six years as a chemist in the company's plastics sales service laboratory, then was transferred to organize new chemical technical service and applications laboratories. He served as manager of the laboratories from 1951 until 1954.

Mr. Kampschulte, who joined the firm in 1947, had been general sales manager of the chemical division for the last four years. He had served previously as assistant general sales manager and eastern district sales manager. A 1935 graduate of Lehigh University with a B. S. degree in chemical engineering, he was associated with Onyx Oil and Chemical Co. before joining Celanese.

Mr. Lindsey had been manager of the chemical manufacturing operations since 1957. A 1936 graduate of Trinity University with a B. S. degree in chemistry, he worked for a time following graduation for the Humble Oil Co. He joined

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the company in 1945 shortly after completion of the company's Bishop, Tex., chemical plant and served there in various production and supervisory posts, becoming plant manager in 1952.

FERRO

James C. Brown joined the research staff, it has been announced. An organic chemist, Mr. Brown holds a masters degree in chemistry from Fisk University, and was formerly associated with the General Electric Com-

pany in Pittsfield, Massachusetts, and the Michigan Abrasive Company of Detroit, Michigan. He is a member of the American Chemical Society and the American Society for Quality Control.

AMOCO

Laurel G. Parkinson, new general manager — marketing, has been elected a director, it has been announced.

Mr. Parkinson joined the company last year as general sales manager—chemicals, coming from Lever Brothers

Company in New York where he had been manager of the industrial chemicals department since 1954. He also held positions in sales, manufacturing, research and development at Atlas Powder Company.

VULCAN

Ruth Janet Zuck has been appointed to the office of Vice President, it has been announced.

Mrs. Zuck has been director of personnel since 1954 and will continue in that capacity with additional duties in sales and production administration.

UNITED WALLPAPER

Arthur W. Slocum has been appointed manager of industrial finishes sales it has been announced.



A. W. Slocum

For eight years prior to this appointment, Mr. Slocum held the position of sales manager at the Illinois paint works division and represented the corporation on special staff assignments. He will now direct and coordinate the industrial finishes sales, product development, technical service and advertising programs for the corporation's six manufacturing plants.

Mr. Slocum is well known to both producers and users of chemical coatings, having a 29-year background of experience in the industry.

PATTERSON FOUNDRY

Reed W. Campbell has been named chief engineer it has been announced.



R. W. Campbell

of Pittsburgh.

Previously he had been product manager in charge of the company's reaction vessels and processing systems.

Mr. Campbell is a U. S. Naval Academy graduate and has done graduate work at University

ARTHUR COLTON

John F. Barry has been named sales engineer it has been announced.



J. F. Barry

Mr. Barry was formerly employed as a sales and service engineer for the Hope Machine Co. of Philadelphia for more than thirteen years. A resident of Rushland, Pa., he attended Providence College.

In his new capacity, he will handle sales of pharmaceuticals and chemical industry machinery.



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PITTSBURGH PLATE

Dr. Elmer C. Larsen has been appointed to the position of director of



E. C. Larsen

commercial development and will report to the divisional vice president it has been announced.

Prior to joining the firm in this new position, Dr. Larsen was associated with the J. T. Baker

Chemical Company where he served as vice president and technical director and as a member of the board of directors.

He has degrees from St. Olaf's College, Montana School of Mines, Stuttgart Institute of Technology in Germany, and University of Wisconsin. He served with Bell Telephone Laboratories and Sylvania Electric Products before joining Baker Chemical.

HEYDEN NEWPORT

George Koch has been named director of commercial development it has been announced.



G. Koch

Mr. Koch has engaged in research, technical service and commercial development activities for the past ten years. Most recently he worked on the development of gibberellins, one of the

new plant growth stimulants and he was a principal in the successful introduction of antibiotics for agriculture. He is a recipient of a patent on "Agrimycin". He was previously associated with Chas. Pfizer and Co., Inc. in research and development activities for industrial chemicals as well as agricultural and biochemical investigations.

MATHERSON-SELIG

Harry D. Winter has become associated with the firm as a partner and



H. D. Winter

vice-president it has been announced. Mr. Winter will supervise all phases of production as well as playing an active role in setting up the company's new London operation.

Formerly vice-president of Acme Paper Box Co., Mr. Winter was in charge of production for the firm for 23 years. He is a past director of The Folding Paper Box Assn., and has been directly responsible for introducing many important concepts of automated production to the paper box industry.

Mr. Winter is a graduate of Northwestern University, and is an active member of the Graphic Arts Assn.

COLTON CHEMICAL

R. L. Hawkins has joined the technical service laboratories it has been announced. He will handle technical service for polyvinyl alcohol.



R. L. Hawkins

Before joining the firm, Mr. Hawkins was with Southern Adhesives Corp., Union Paste Co. and Special Products Corp. He

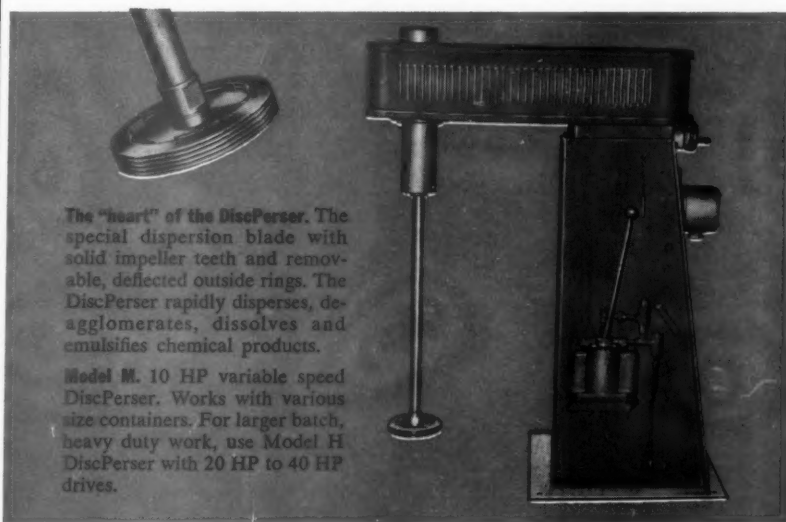
holds patents on adhesives using polyvinyl alcohol and has extensive experience in solid fiber laminations, coatings, and adhesives. He was graduated from Duke University with a degree in chemistry and did graduate work at the University of Richmond (Va.)

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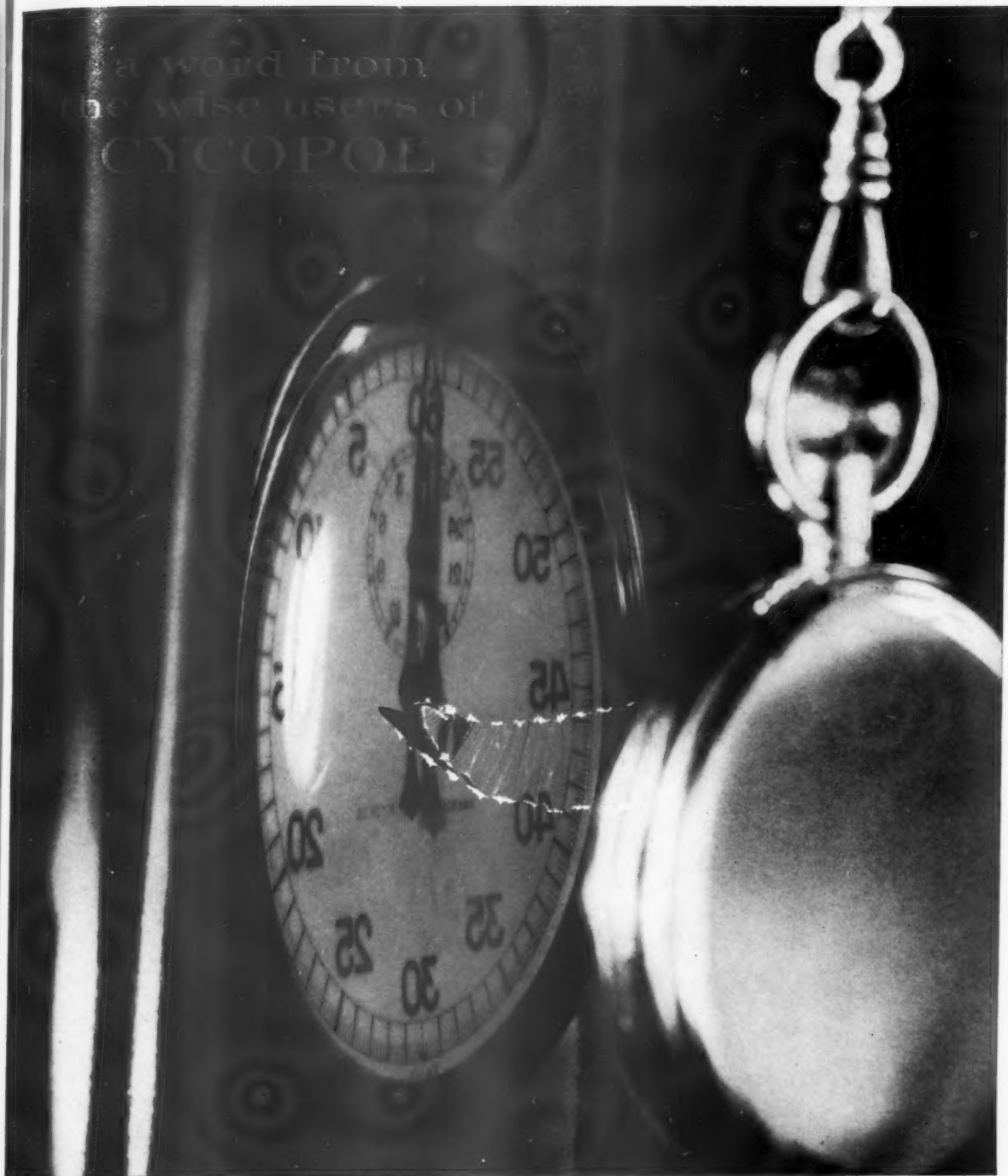
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HYDRITE-GLOMAX

EXTENDER PIGMENTS

improve
hiding power

at
lower cost



HYDRITE Kaolinites, in combination with **GLOMAX** Calcined Clays, improve hiding power at substantially lower cost in latex formulations.

GLOMAX Calcined Clays, when used with **HYDRITE** Kaolinites, offer the following advantages to all of the major emulsion paint systems:

1. Increased contrast ratio at all brightness levels with the same prime white pigment volume.
2. Increased reflectance at higher PVC levels with increasing amounts of **GLOMAX** extender.
3. Reduced gloss with increasing amounts of **GLOMAX** extender.

Technical data reports **TSBA-15** and **TSBG-6**, and free samples, are available upon request.

Contact your nearest **GK** distributor, or write direct to:

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